



اسم المقرر: مهارات التواصل

كود المقرر: H101

القسم القائم بتدريس المقرر	علوم الحاسب

1- معلومات أساسية :

نوع المقرر	اجباري	الفرقة الدراسية / المستوى الدراسي الذي يقدم فيه المقرر	الفرقة/المستوى الاول
العام الأكاديمي الفصل الدراسي	2026/2025	أكتوبر	عدد الساعات المعتمدة
ساعات الإتصال:	المحاضرة: 2	التمارين:	المعامل:
المتطلب السابق:			إجمالي 2
المعايير الأكاديمية	NARS 2018		
تاريخ الموافقة على اللانحة	2022		
منسق المقرر	د/ محمد أبو زيد		
تاريخ اعتماد توصيف المقرر	2025/8/20		
جهة مناقشة واعتماد توصيف المقرر	مجلس/ القسم		

2. الوصف العام للمقرر:

يهدف هذا المقرر إلى تزويد الطالب بأحدث المعارف حول مفاهيم وخصائص وأنواع الاتصالات الإدارية والشخصية، بالإضافة إلى مفاهيم ومتطلبات الاستماع الجيد والعرض التقديمي، وتطوير قدرات ومهارات الطالب في التواصل الفعال والاستماع الجيد، وكذلك كيفية استخدام أساليب الاتصال الشخصي والإداري وتقنيات العرض في الأداء والتعامل مع الآخرين داخل وخارج المنظمة

3. مخرجات التعلم المستهدفة:

أ- المعرفة والفهم:

1. معرفة المفاهيم المتعلقة بالاتصال خاصة في مجال العمل والقوانين الخاصة بالتقارير والاجتماعات والعروض
2. فهم النظريات المفسرة لعملية الاتصال وإدراك طبيعة ونمط العلاقات بين الأفراد
3. التعرف على أنواع الاتصالات والمهارات اللازمة في مجال العمل

ب - المهارات الذهنية:

- ب. 1 تشخيص أنماط الشخصيات والعلاقات الصحيحة على المستوى الشخصي وفي مجال العمل
- ب. 2 مقارنة سلوكه قبل وبعد اكتسابه للمعارف والمهارات المختلفة في عملية الاتصال
- ب. 3 تنمية مهارة حل المشكلات



ج - المهارات المهنية:

- ج. 1 توظيف المعارف والمهارات التي حصل عليها في مجال العلاقات الشخصي
- ج. 2 القدرة على تحليل الخيارات والتجارب الحياتية خاصة في مجال العمل
- ج. 3 تعزيز العديد من السلوكيات والمهارات داخل وخارج نطاق العمل بحيث يعمل ضمن فريق يظهر مهارات التواصل مع الآخرين، وكذلك قدرات التعلم الذاتي

د- المهارات العامة:

- د. 1 العمل بحب واثقان داخل المنظمة وإظهار مهارات إدارة الوقت بكفاءة في مجال أي مهنة.
- د. 2 التحديث بمهارة فائقة أثناء تقديم العروض واستخدام تكنولوجيا المعلومات بما يخدم الممارسة المهنية

4. مساهمة المقرر في اهداف التعلم المستهدفة من البرنامج:

اتساق مخرجات التعلم المستهدفة مع مخرجات البرنامج

مخرجات التعلم المستهدفة		مخرجات البرنامج / المعايير الأكاديمية المتبناة (التي يحققها المقرر تبعا للمصفوفة في توصيف البرنامج)	
		النص	الكود
معرفة المفاهيم المتعلقة بالاتصال خاصة في مجال العمل والقوانين الخاصة بالتقارير والاجتماعات والعروض	أ.1	الحقائق الأساسية والمفاهيم والمبادئ والنظريات المتعلقة بالحوسبة والمعلومات وتطبيقات الحاسوب، بما يتناسب مع البرنامج الدراسي المعتمد.	أ 1
التعرف على أنواع الاتصالات والمهارات اللازمة في مجال العمل	أ.3	الأدوات والممارسات والمنهجيات المستخدمة في تحديد المواصفات وتصميم وتنفيذ وتقييم نظم البرمجيات الحاسوبية.	أ 3
فهم النظريات المفسرة لعملية الاتصال وإدراك طبيعة ونمط العلاقات بين الأفراد	أ.2	القضايا المهنية والأخلاقية والمعنوية المرتبطة باستغلال تقنيات الحاسوب، مع ضرورة الالتزام بالممارسات المهنية والأخلاقية والقانونية الملائمة لصناعة الحوسبة والمعلومات	أ 9
تشخيص أنماط الشخصيات والعلاقات الصحيحة على المستوى الشخصي وفي مجال العمل	ب.1	إدراك المفاهيم والمبادئ والنظريات والممارسات الكامنة وراء الحوسبة والمعلومات باعتبارها تخصصاً أكاديمياً.	ب 2
مقارنة سلوكه قبل وبعد اكتسابه للمعارف والمهارات المختلفة في عملية الاتصال	ب.2	تحليل واقتراح وتقييم البدائل من نظم الحاسوب والعمليات، مع الأخذ في الاعتبار القيود التقنية ومعايير الجودة	ب 4
تنمية مهارة حل المشكلات	ب.3	الإلمام بالقضايا المهنية والقانونية والأخلاقية والمعنوية ذات الصلة بصناعة الحوسبة	ب 8
توظيف المعارف والمهارات التي حصل عليها في مجال العلاقات الشخصي	ج.1	تشغيل معدات الحوسبة مع إدراك خصائصها المنطقية والمادية، وإمكاناتها، والقيود المرتبطة بها	ج 1
القدرة على تحليل الخيارات والتجارب الحياتية خاصة في مجال العمل	ج.2	نشر المعدات والأدوات المستخدمة في بناء وصيانة وتوثيق تطبيقات الحاسوب	ج 3
تعزيز العديد من السلوكيات والمهارات داخل وخارج نطاق العمل بحيث يعمل ضمن فريق يظهر مهارات التواصل مع الآخرين، وكذلك قدرات التعلم الذاتي	ج.3	تصميم وتنفيذ وصيانة وإدارة أنظمة البرمجيات	ج 6



مخرجات التعلم المستهدفة		مخرجات البرنامج / المعايير الأكاديمية المتبناة (التي يحققها المقرر تبعاً للمصفوفة في توصيف البرنامج)	
		النص	الكود
العمل بحب وإتقان داخل المنظمة وإظهار مهارات إدارة الوقت بكفاءة في مجال أي مهنة	1.د	إظهار المهارات في العمل الجماعي، إدارة الفريق، إدارة الوقت، والمهارات التنظيمية.	2
التحدث بمهارة فائقة أثناء تقديم العروض واستخدام تكنولوجيا المعلومات بما يخدم الممارسة المهنية	2.د	إستخدام مزيج مناسب من الأدوات والمعينات في إعداد وتقديم التقارير لمجموعة متنوعة من الجماهير، بما في ذلك الإدارة، والفنيين، والمستخدمين، والقطاع الصناعي، والمجتمع الأكاديمي	4

5. محتوى المقرر:

مخرجات التعلم المستهدفة المغطاة بواسطة المقرر	ساعات الاتصال			مجموع الساعات	الموضوع	رقم الأسبوع
	معمل	حصة تمارين	محاضرة			
1.أ	-	-	2	2	تعريف بالمقرر الدراسي	الأسبوع-1
1.أ- 2.أ- 3.ب	-	-	2	2	تعريف مفهوم الاتصال - طبيعة وعناصر الاتصال	الأسبوع-2
1.أ- 2.ب- 3.ج	-	-	2	2	بعض النظريات المفسرة للاتصال - الاتصال الفعال - معوقات الاتصال	الأسبوع-3
1.أ- 3.ج- 3.د	-	-	2	2	الاتصالات الشخصية - الاتصالات الإدارية - الاتصالات الرسمية والغير رسمية	الأسبوع-4
1.أ- 3.ب- 3.ج	-	-	2	2	الاتصالات المكتوبة (التقارير والمذكرات) - الاجتماعات	الأسبوع-5
1.ج- 2.ب- 3.ج	-	-	2	2	لغة الجسد- تنظيم الوقت	الأسبوع-6
2.ج- 2.د	-	-	2	2	المقابلة الشخصية - الإتصاات الجيد	الأسبوع-7
إمتحان نصف الفصل						الأسبوع-8
1.ج- 3.ج- 1.د- 2.د	-	-	2	2	العرض الشفهي الفعال	الأسبوع-9
1.ج- 3.ج- 1.د- 2.د	-	-	2	2	الإعداد الجيد للعرض الشفهي الفعال	الأسبوع-10
1.ج- 3.ج- 1.د- 2.د	-	-	2	2	المناقشة والرد على الاعتراضات	الأسبوع-11
2.ب- 3.د	-	-	2	2	تدريبات متنوعة يقوم بها الطلاب لتعزيز التواصل الفعال	الأسبوع-12
2.ب- 3.د	-	-	2	2	مراجعة وتدريبات متنوعة يقوم بها الطلاب لتعزيز التواصل الفعال	الأسبوع-13
1.ج- 2.ج- 1.د- 2.ب	-	-	2	2	مراجعة نهائية	الأسبوع-14

6. طرق التعليم و التعلم للمقرر:

التدريس المباشر		التدريس الغير مباشر										استراتيجيات التعلم بمساعدة تكنولوجيا المعلومات			
المحاضرات	العملية والتجارب التمارين	العصف الذهني	الجماعية المشروعات على القائم التعلم	الحالة دراسة استراتيجية	حل المشكلات	الأبحاث / التقارير كتابة	والمناقشة الحوار	الميداني التدريب	الميدانية الزيارات	التعلم الذاتي	التعلم بالاكشاف	النمذجة أو المحاكاة برامج	الافتراضية المعامل	التعلم الإلكتروني	النقاء الاصطناعي في التعليم
√		√		√	√	√	√			√	√	√		√	√

7. طرق تقييم الطلاب:

م	طرق التقييم *	توقيت التقييم المتوقع (رقم الأسبوع الدراسي)	درجات التقييم	النسبة المئوية من إجمالي درجة المقرر
1	امتحان 1 تحريري (أعمال سنة)	5	10	10 %
2	امتحان 2 تحريري (أعمال سنة)	12	10	10 %
3	امتحان منتصف الفصل الدراسي	7	20	20 %
4	امتحان نهائي تحريري	15 و 16	60	60 %
5	امتحان نهائي عملي	-	-	-
6	امتحان نهائي شفوي	-	-	-
7	تكاليفات / مشروع	-	-	-
8	تدريب ميداني	-	-	-
9	أخرى (تذكر)	-	-	-



8. مصادر التعلم والتسهيلات المادية:

"مهارات التواصل" مذكرات المقرر	المرجع الأساسي للمقرر (لابد من كتابة البيانات كاملة وفقا لطريقة توثيق علمي)	
• حجازي، أ. ت. (2014). مهارات التواصل. عمان: دار كنوز المعرفة • Gary Johns, M Saks, Organization behavior, Addison Wesley Longman, 2009	المراجع الأخرى	مصادر التعلم (الكتب والمراجع العلمية وغيرها) *
• http://www.du.edu.eg/ https://www.youtube.com/watch?v=bnCua19M_EA	المصادر الإلكترونية (لابد من إضافة الروابط)	
Microdof Teams	المنصة التعليمية (لابد من إضافة الرابط)	
	الأجهزة	التجهيزات التعليمية
	المستلزمات	المساعدة للتعليم
	أخرى (تذكر)	والتعلم *

منسق البرنامج	منسق المقرر	
د/ رانيا رجب	د/ محمد أبو زيد	الإسم
		التوقيع



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

Course Code: H 102

Course Name: English Language

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught		Level 1	
Term/ Academic year	Oct.		2025/2026		Credit Hours:		2	
Contact Hours	Lecture:	2	Tutorial:		Lab.:		Total	2
Pre-Requisite								
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Mai M. Abouzaid					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course enables learners to develop the ability to communicate clearly, accurately and effectively, using a wide range of vocabulary, and the correct grammatical rules, in addition to spelling and punctuation rules to develop their personal style and their awareness of using English language. Learners are also encouraged to read widely, both for their own knowledge and to further their masterfulness of the ways in which English can be used

3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the course, students should be able to:

- a.1. Motivate student to have a mix of skills in English Language.
- a.2. Understand spoken English at a conversational pace on familiar topics.
- a.3. Participate in conversations and discussions on a range of everyday topics.

H 102- English Language



- a.4. Write clear and concise paragraphs and short essays.

b. Intellectual skills:

On successful completion of the course, students should be able to:

- b.1. Analyze a variety of texts, including news articles, emails, and short stories.
- b.2. Express ideas with fluency and confidence in speaking and writing English.
- b.3. Clarify concepts giving examples.

c. Professional and practical skills:

On successful completion of the course, students should be able to:

- c.1. Prepare presentations and speeches with confidence.
- c.2. Generate ideas using English language correctly.
- c.3. Develop content and post it online.

d. General and transferable skills:

On successful completion of the course, students should be able to:

- d.1. Communicate and participate professionally.
- d.2. Exhibit awareness of team-work dynamics
- d.3. Show ability to work effectively on multi-disciplinary systems and integration of different fields of knowledge.
- d.4. Demonstrate 21st century skills.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a2,a3
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a4
B2	Realize the concepts, principles, theories and	b1



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	practices behind computing and information as an academic discipline.	
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.	b2
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b3
C10	Communicate effectively by oral, written, and visual means.	c1
C11	Perform independent information acquisition and management, using scientific literature and Web sources.	c2
C12	Prepare and present seminars to a professional standard.	c3
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d1, d3
D6	Reveal communication skills, public speaking and presentation skills, and delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.	d2, d4



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Course Specification

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Unit One: What does it mean to be polite?	2	2	-	-	a1.a3.b3
Week-2	What does it mean to be polite? (<i>Continued</i>)	2	2	-	-	a1.a4.c2
Week-3	Unit Two: Do you prefer to get help from a person or a machine?	2	2	-	-	a1.b2.c2
Week-4	Do you prefer to get help from a person or a machine? (<i>Continued</i>)	2	2	-	-	a3.b3.d4
Week5	Unit Three: Does everyone need Math?	2	2	-	-	a3.b3.d2
Week-6	Does everyone need Math? (<i>Continued</i>)	2	2	-	-	a1.a3.b2.c2.d2
Week-7	Unit four: Why does Something become popular?	2	2	-	-	a1.a3.b2.c2.
Week-8	Midterm Exam.					
Week-9	Why does Something become popular? (<i>Continued</i>)	2	2	-	-	c1.c2.d3
Week-10	Unit Five: Are Social networking sites	2	2	-	-	c2.c3.d2.d3
Week-11	Unit Six: Is it better to save what have or buy new things?	2	2	-	-	a1.a4.b2.c2.d3
Week-12	Presentations	2	2	-	-	c1.c2.d1.d3
Week-13	Revision	2	2	-	-	a2.a4.b1.b2.d4
Week-14	Revision and Quiz	2	2	-	-	a2.a4.b1.b2.d4



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓		✓				✓	✓			✓					✓

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	14	10	10 %
2	Quiz 2 written (Semester work)	-	-	-
3	Midterm exam	7	20	20 %
4	Final Written Exam	15, 16	60	60%
5	Final Practical Exam	-	-	-
6	Final Oral Exam	-	-	-
7	Assignments / Project	-	-	-
8	Field training	-	-	-
9	Other (Mention) "Class work for lecture "	Weekly	10	10%



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Rasha Osman & Mai M. Abouzaid, " English Language for Computer Science Students"; HTI; 2024, Available Hard & Electronic copies
	Other References	• Debra Daise& Charl Norloff, Q Skills for Success. Oxford Publishing Inc, 2024. • Liz, Jo Mccaull & John Soars, Headway. Oxford Publishing Inc, 2023. • Adrian Doff, Craig Thaine& Herbert Puchta. Empower. Cambridge University Press, 2022. • Jeff Stranks& Peter Lewis-Jones. Cutting Edge. Cambridge University Press, 2024.
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Mai M. Abouzaid	Dr. Rania Ragab Hussien
Signature		



Course Code: BS 104

Course Name: Electronics

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 1		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	2	Lab.:	-	Total	4
Pre-Requisite	-							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr/Sarah Ahmed Soliman					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course covers the following topics, electrical circuit variables and elements, Techniques of circuit analysis, study, and analysis the natural This course gives strong foundation in electrical and electronic circuits with an emphasis on their applications. Topics include Basic concepts of electrical circuit variables and elements, Basics laws and electrical circuit analysis methods, Inductors, Capacitors and Transient circuits, Sinusoidal steady state analysis, Semiconductors diode, diode applications, BJT and its applications, FET, and its applications, OPAMP and its applications.

3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:



- a.1 Understand the essential mathematics relevant to electrical and electronic science.
- a.2 Demonstrate basic knowledge and understanding of a core of analysis, algebra, applied mathematics and statistics for electrical and electronic field.
- a.3 Interpret and analyzing data qualitatively and/or quantitatively for electrical and electronic science.
- a.4 Understand the fundamental topics in Computer Science, including hardware and methodologies for electrical and electronic science.
- a.5 Select advanced topics to provide a deeper understanding of some aspects of electrical and electronic science., such as hardware systems design.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Perform comparisons between (methods, techniques...etc) in electrical and electronic science.
- b.2. Perform classifications of (data, results, methods, techniques, algorithms. etc.) in electrical and electronic science.
- b.3. Summarize the proposed solutions and their results.
- b.4. Restrict solution methodologies upon their results.
- b.5. Establish criteria and verify solutions.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Perform independent information acquisition and management, using the scientific literature and Web sources.
- c.2. specify, design, and implement electronic circuits.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.
- d.2. Demonstrate skills in group working, team management, time management and organizational skills.
- d.3. Show the use of information retrieval.
- d.4. Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry or the academic community.



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Course Specification

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A12	Essential mathematics relevant to computer science.	a1
A14	Demonstrating basic knowledge and understanding of a core of analysis, algebra, applied mathematics and statistics.	a2
A15	Interpreting and analyzing data qualitatively and/or quantitatively.	a3
A18	The fundamental topics in Computer Science, including hardware and software architectures, software engineering principles and methodologies.	a4
A19	Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design.	a5
B11	Perform comparisons between algorithms, methods, techniques, etc.	b1
B12	Perform classifications of (data, results, methods, techniques, algorithms, etc.).	b2
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b3
B14	Summarize the proposed solutions and their results.	b4
B15	Restrict solution methodologies upon their results.	b5



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Basic concepts (SI Units, charge, current, voltage, power and energy, Active and passive elements)	4	2	2	-	a1, a2, a3, b2
Week-2	Basic Laws: Ohm's Law, Nodes, Branches, and Loops, Kirchhoff's Laws.	4	2	2	-	a1, a2, a3, a4 b1, b2, b3, b4, b5, c2
Week-3	Electrical circuit analysis method and Circuit theorem's part I	4	2	2	-	a1, a2, a3, a4 b1, b2, b3, b4, b5, c2
Week-4	Electrical circuit analysis method and Circuit theorem's part II	4	2	2	-	a2, a3, a4, b1, b2, b3, b4, b5, c2
Week5	Inductors, Capacitors and Transient circuits	4	2	2	-	a3, a4, a5, b1, b2, b3, b4, b5, c2
Week-6	Sinusoidal steady state analysis.	4	2	2	-	a4, b1, b2, b3, b4, b5, c2
Week-7	Midterm Revision and reminder	4	2	2	-	a4, a5, b1, b2, b3, b4, c2
Week-8	Midterm Exam.					
Week-9	Semiconductors and diode	4	2	2	-	a4, a5, b3, b4, b5, c2
Week-10	Models for diode and Diode applications (HWR and FWR).	4	2	2	-	a4, a5, b3, b4, b5, c2
Week-11	Bipolar Junction Transistor (BJT)	4	2	2	-	a4, b1, b2, b3, b4, b5, c2
Week-12	Field Effect Transistors (FET)	4	2	2	-	a1, a2, a3, b3, b4, b5, c2
Week-13	OPAMP	4	2	2	-	a5, b3, b4, b5, c1, c2, d1, d2
Week-14	Revision and Mini project	4	2	2	-	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓		✓	✓		✓	✓	✓								



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	weekly	10	10 %
2	Quiz 2 written (Semester work)	weekly	10	10 %
3	Midterm exam	87	20	20 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam		0	
6	Final Oral Exam		0	
7	Assignments / Project		0	
8	Field training		0	
9	Other (Mention)		0	

8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	C. K. Alexander and M. N.O. Sadiku," Fundamentals of Electric Circuits" 6th edition, McGraw Hill, 2016.
	Other References	- Thomas L. Floyed, "Principles of electric circuits," Prentice Hall, 8th edition, 2007 - ROBERT BOYLESTAD, LOUIS NASHELSKY," ELECTRONIC DEVICES AND CIRCUIT THEORY," Prentice Hall, 10th edition (1999)
	Electronic Sources (Links must be added)	Journal of computational electronics in Springer



	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr/Sarah Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

Course Code: BS 201

Course Name: Operations Research

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level one		
Term/ Academic year	Feb.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	2	Lab.:	-	Total	4
Pre-Requisite	BS 101							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			PROF. DR. YOUSRYIA ABO ELNAGA					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course presents new description: convex set function and concave function, feasible region of solution, and modeling in operations research, linear programming, graphical method, Duality, sensitivity analysis, network models, shortest path, maximum flow problems, transportation, and assignment problems. The course also includes case studies on Game theory, Fractional linear programming. The student should understand how to formulate problems, construct, and solve mathematical models, and apply the systems approach to problem solving. Also be able to apply the general concepts of optimization to solve these models.



3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1 Recognize the fundamental concepts of operations research theory and application.
- a.2 Expresses logically to solve problems.
- a.3 Understand the different types of problems like linear programming problems.
- a.4 Decide under certainty, uncertainty, and risk.
- a.5 Understand the theoretical workings of the different methods for linear programming and perform iterations of it by hand.
- a.6 Formulate the problems as a network and graphs.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1 Analyze mathematical models.
- b.2 Apply practical techniques for formulating and solving common optimization problems.
- b.3 Solve linear programming problem with the different optimization techniques.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1 Employ gained skills in mathematics to create algorithms.
- c.2 Suggest most moderate method to solve linear programming problems.
- c.3 Develop and evaluate solutions to problems in computer vision.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1 Work effectively with others.
- d.2 Demonstrate ability to think critically.
- d.3 Design computer algorithms and software to model linear programming problems.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a2
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a3
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a4
A6	The current and underlying technologies that support computer processing and inter-computer communication.	a5
A11	Requirements, practical constraints, and computer-based systems.	a6
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b1
B7	Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact	b2
B10	Define traditional and nontraditional problems, set goals towards solving them, and. observes results.	b3
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c1
C4	Apply computing information retrieval skills in computing community environment and industry.	c2
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c3
D3	Show the use of information-retrieval.	d1
D5	Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.	d2
D7	Show the use of general computing facilities.	d3



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5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs.</i>			ILOs Covered by Course
			Lec.	Tut.	Lab.	
<i>Week -1</i>	Operations Research historical background	4	2	2	-	a1, a2, a3
<i>Week-2</i>	Mathematical Programming Model. Linear programming Problem	4	2	2	-	a2, a3, b1
<i>Week-3</i>	Linear Programming Problem formulation	4	2	2	-	a2, a4, a6, b2
<i>Week-4</i>	Graphical Solution of LP problem.	4	2	2	-	a4, b3, c3,
<i>Week5</i>	Fundamental of the Algebraic solution of the Simplex Method Using STORM for solving the LP problem	4	2	2	-	a4, a5, b3, c1, c2, d1
<i>Week-6</i>	Different methods of solving the transportation problem. Northwest Method Row Minimum Method Matrix Minimum Method Vogle`s Approximation Method	4	2	2	-	a4, a5, a6, b3, c2, c3
<i>Week-7</i>	Revision	4	2	2	-	
<i>Week-8</i>	Midterm Exam					
<i>Week-9</i>	How to evaluate the transportation problem solution and how to get an optimal solution. Using STORM for solving the Transportation Problem	4	2	2		a4, a5, b2, b3, c1, c2, d1
<i>Week-10</i>	How to evaluate the Assignment problem solution and how to get an optimal solution	4	2	2		a4, a5, b2, b3, c1, c2
<i>Week-11</i>	Fundamental of network for a project management	4	2	2		a6, b3, c3, d1, d2
<i>Week-12</i>	Arrow Networking Diagram Representation the critical path method	4	2	2		a5, a6, b1, b2, b3, c2, d3
<i>Week-13</i>	Project Scheduling and Resources Planning (Gant chart)	4	2	2		a6, b3, c3, d1, d2
<i>Week-14</i>	Fundamental of the shortest route problem.	4	2	2		a5, a6, b1, b2, b3, c2, d3



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brainstorming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√					√	√		√						

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	5	5%
2	Quiz 2 written (Semester work)	10	5	5%
3	Midterm exam	8	20	20 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	0	
6	Final Oral Exam	-	0	
7	Assignments / Project	All weeks	10	10%
8	Field training	-	0	
9	Other (Mention)	-	0	



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	• “Operations Research – An Introduction” by Hamdy A. Taha, 11th edition, 2023
	Other References	• Convex Optimization by Stephen Boyd and Lieven Vandenberghe (2004, 2nd edition released in 2023) • Fundamentals of Optimization by Mohan C. S. Reddy and A. Ravi Ravindran (2020) • Mathematical Programming: Theory and Methods by R. G. K. Meena (2021)
	Electronic Sources (Links must be added)	-----
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Prof. Dr. Yousria Abo Elnaga	Dr. Rania Ragab Hussien
Signature		



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

Course Code: BS 202

Course Name: PHYSICS

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 1		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	2	Lab.:	-	Total	4
Pre-Requisite	-							
Academic standards			NARS 2010					
Bylaw Approval			2001					
Course Coordinator			Dr. Mohamed Abozeid					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course gives an introduction to analog and digital electronics with an emphasis on their use in the laboratory. Topics include linear devices and basic linear circuit analysis, diodes, transistors, op-amps, the use of digital components including logic gates, flip-flops, counters, clocks and microcontrollers, and analog to digital conversions.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1.Explain the units and dimensions
- a.2.Define the electric force and electric field of several electric charges.
- a.3.Explain the capacitance of different shape of capacitors.

BS 202- Physics



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

- a.4. Explain the fundamental of semiconductor physics.
- a.5. Define Analog and Digital concepts.
- a.6. Explain number system.
- a.7. Define the logic gate, Boolean algebra and its applications.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Solve problems in the previous field
- b.2. Analyze the fundamentals of physics with the law of nature and explain it.
- b.3. Correlate between the laws from different fields.
- b.4. Explain the Organization of Information Systems.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Apply the vector analysis to estimate the electric field and force of charges
- c.2. Demonstrate skills of applications of diode and logic gate.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Working in a team group.
- d.2. Can perform and explain the gained knowledge orally.
- d.3. Solving problems related to electromagnetism

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications.	a1
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a4, a5
A6	The current and underlying technologies that support computer processing and inter-computer communication.	a6, a7
A8	Management and economics principles relevant to computing and information disciplines.	a5
A9	Professional, moral, and ethical issues involved in the exploitation of computer technology.	a5
A11	Requirements, practical constraints, and computer-based systems.	a4



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Course Specification

A14	Demonstrating basic knowledge and understanding of a core of analysis, algebra, applied mathematics and statistics.	a2, a3
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1
B12	Perform classifications of (data, results, methods, techniques, algorithms, etc.).	b2
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b3, b4

5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Introduction – Units and Dimension in physics	4	2	2	0	a1, a2,a3
Week-2	Characteristics of electric charge - electric force – electric field	4	2	2	0	a2,a3, b1,c3
Week-3	Electric field due to dipole, charged ring ,equatorial line	4	2	2	0	a2, a4, b2, c1,d3
Week-4	Calculating the capacitance connection of capacitors – storing energy in an electric field- Capacitors with dielectric materials.	4	2	2	0	a4, a5, b5, c1, c2, d1
Week5	Electric current – current density – electric resistivity – Ohm's law	4	2	2	0	a4, b3,c3,d3
Week-6	Energy and power in electric circuit	4	2	2	0	a4, a5, b4, b5 c2, c3,
Week-7	Revision	4	2	2	0	a4, a5, b4, b5 c2, c3,
Week-8	Midterm Exam.					
Week-9	Semiconductor basics, N-Type, P- Type Semiconductors, the P-N Junction and Diode applications	4	2	2	0	a4, b3,c3,d3
Week-10	Special-Purpose Diodes (Zener Diodes) and Zener application	4	2	2	0	a4, a5, b2, b4, c1, c2
Week-11	Analog and Digital concepts	4	2	2	0	a2, a4, b2, c1,d3
Week-12	Number system (Binary, decimal, Octa and Hexa)	4	2	2	0	a4, a5, b2,
Week-13	Boolean algebra	4	2	2	0	a4, a5, b3
Week-14	The logic gate and its applications (Adder, Subtractor, Counter and Flip Flop)	4	2	2	0	a4, b3,c3,d3



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓		✓		✓	✓	✓			✓					

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	weekly	10	10 %
2	Quiz 2 written (Semester work)	weekly	10	10 %
3	Midterm exam	7	20	20 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam		0	
6	Final Oral Exam		0	
7	Assignments / Project		0	
8	Field training		0	
9	Other (Mention)		0	



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Lyublinskaya et al., College Physics for AP Courses OpenStax. XanEdu Publishing Inc, 2022.
	Other References	• Raymond A. Serway, Chris Vuille, J. Hughes. College Physics Global Edition, 11th ed. Cengage Learning, 2018. • M. Morris Mano, Digital Logic and Computer Design, Prentice- Hall, Inc. of India - 2000. • J. Raymond A. Serway, John W. Jewett, Physics for Scientists and Engineers with Modern Physics, 9th ed. Boston, MA 02210 USA: Physical Sciences: Mary Finch, Physics and Astronomy: Charlie Hartford, 2014 • . Raymond A. Serway, Chris Vuille, J. Hughes. College Physics Global Edition, 11th ed. Cengage Learning, 2018.4. • D. Halliday, R. Resnick, and J. Walker, Fundamentals of Physics, 12th ed. Wiley, 2022. • S.M. Sze and M.K. Lee, Semiconductor Devices Physics and Technology, John Wiley & Sons, 2012 - Thomas L. Floyd, Digital Fundamentals, Seventh Edition, Prentice-Hall, Inc. 2000.
	Electronic Sources (Links must be added)	• http://hyperphysics.phy-astr.gsu.edu/hbase/index.html https://www.physicsclassroom.com/
	Learning Platforms (Links must be added)	Microsoft Teams
	Supportive facilities & equipment for teaching and learning *	
	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Mohamed Abozeid	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

Course Code: CS 101

Course Name: Introduction to Computer Science

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level one		
Term/ Academic year	Oct.	2025/2026			Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	-----							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. RANIA RAGAB HUSSEIN					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course provides basic computer terminology, hardware and software components, and communications technology. The different number systems (decimal, binary, hexadecimal) should be explored. The course should give a tour of the branches of computer science: computer programming, graphics, networks, system analysis and design. This course also focuses on Operating systems design and implementation. Basic structure, Process and thread management, process synchronization and communication mechanisms, Memory organization and management, I/O device management, secondary storage, and file system.



3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a1. Define Computer system and its components.
- a2. Define the Difference between Computer Hardware and Software.
- a3. Define how different types are represented inside digital computers.
- a4. Differentiate between input & output devices and their usage.
- a5. Recognize the fundamental concepts of computer science.
- a6. Understand the structure and functions of file systems in operating systems.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Recognize the computer components.
- b2. Identify the role of different types of software, and operating systems.
- b3. Solve the trouble shouting.
- b4. Recognize the basics of programming.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Practice manipulating and dealing with computer components
- c2. Practice efficient usage of the computer, windows, and internet
- c3. Carry out and apply the knowledge in the computer science application.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Apply concepts to practical problems and scenarios in computing.
- d2. Apply file system knowledge to real-world computing problems and scenarios.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a2
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development.	a3
A6	The current and underlying technologies that support computer processing and inter-computer communication.	a4
A9	Professional, moral, and ethical issues involved in the exploitation of computer technology and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.	a5
A10	Current developments in computing and information research.	a6
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.	b2
B8	Familiar with the professional, legal, moral, and ethical issues relevant to the computing industry.	b3
B9	Evaluate research papers in a range of knowledge areas	b4
C1	Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.	c1
C3	Deploy the equipment and tools used for the construction, maintenance, and documentation of computer applications.	c2
C5	Develop a range of fundamental research skills, using online resources, technical repositories and library-based material	c3
D3	Show the use of information-retrieval.	d1
D7	Show the use of general computing facilities.	d2



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Computer Science Department

Course Specification

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs.</i>			ILOs Covered by Course
			Lec.	Tut.	Lab.	
<i>Week -1</i>	Computers as a Tool for an Information Age Historical Background	4	2	-	2	a1
<i>Week-2</i>	Classification of Computers	4	2	-	2	a2
<i>Week-3</i>	Introduction and Overview of a computer system: hardware, software	4	2	-	2	a2, a3, a4
<i>Week-4</i>	Classification of computers - Computer Software/Hardware - Categories of software	4	2	-	2	a2, a3, a4
<i>Week5</i>	Operating systems (OS): Understand the role of the operating system in a computer system.	4	2	-	2	a3, a6, b1, b2
<i>Week-6</i>	Introduction to the Basic Components of Computer: Networking, Internet, Intranet	4	2	-	2	a5, b1, b2
<i>Week-7</i>	Revision					
<i>Week-8</i>	Midterm Exam.					
<i>Week-9</i>	Numerical Systems: Decimal, Binary, Octal, and Hexadecimal systems	4	2	-	2	a5, b1, b2
<i>Week-10</i>	Numerical Systems	4	2	-	2	a5, b1, b2
<i>Week-11</i>	Boolean Logic and Gates	4	2	-	2	a5, b1, b2
<i>Week-12</i>	Programming and languages	4	2	-	2	b1, b2, b4, c1, c2, c3, d1, d2
<i>Week-13</i>	Flow Charts	4	2	-	2	b1, b2, b4, c1, c2, c3, d1, d2
<i>Week-14</i>	Revision and lab exam	4	2	-	2	-----



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brainstorming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√					√	√		√						

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	5	5%
2	Quiz 2 written (Semester work)	10	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	
7	Assignments / Project	All weeks	10	10%
8	Field training	-	0	
9	Other (Mention)	-	0	



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	• Introduction to Computing Systems: From Bits & Gates to C & Beyond (3rd Edition) by Yale N. Patt and Sanjay J. Patel (2020).
	Other References	• Computer Science Illuminated (7th Edition) by Nell Dale and John Lewis (2020). • Computer Science: An Interdisciplinary Approach by Robert Sedgewick and Kevin Wayne (2016).
	Electronic Sources (Links must be added)	• IEEE transactions on computers and software.
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

Course Code: CS 102

Course Name: Computer Programming

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level One		
Term/ Academic year	Feb.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 101							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Sarah Ahmed Soliman					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

Introduction to programming, how to think in designing a program, writing a program, the compiler, programming language fundamentals (basic data types – program structure – statements – expressions – I/O operations – control statements – computer architecture - algorithms).

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1.Understand of the basic phases of Compilation
- a.2.Be able to understand how do compilers operate
- a.3.Demonstrate a clear understanding of how compilers are structured.
- a.4.Construct a compiler for a small programming language.



a.5. Define the ethical issues involved in the exploitation of computer program

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Express computing problems and provide solutions to them
- b.2. Summarize the concepts and practices behind computing as an academic discipline.
- b.3. Give examples for ideas and designs for computing programs.
- b.4. Explain the professional issues relevant to the computing industry.
- b.5. Explain research papers in a range of solving computing problems.
- b.6. Perform comparisons between different programming techniques.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1 Design a typical compilation phase
- c.2 Implement a simple compiler programs (e.g., Python, Java, C++, JavaScript).
- c.3 Represent and implement compiler solutions for compiler problems.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Demonstrate skills in group working, team management, time management and organizational skills.
- d.2. Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry or the academic community.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a1
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a2
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a1, a3
A9	Professional, moral, and ethical issues involved in the exploitation of computer technology and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.	a5



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

A10	Current developments in computing and information research	a4
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems	b1
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline	b2
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b3
B8	Familiar with the professional, legal, moral, and ethical issues relevant to the computing industry.	b4
B9	Evaluate research papers in a range of knowledge areas	b5
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b6
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c1
C6	Design, implement, maintain, and manage software systems.	c2
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems	c3
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d1
D7	Show the use of general computing facilities.	d2

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Introduction to Computer Programming	4	2	-	2	a1, a2, a3, b2
Week-2	Concept of programming and algorithms	4	2	-	2	a1, a2, a3, a4, b1, b2
Week-3	Variables and Data Types	4	2	-	2	a1, a2, a3, a4, b1, b2
Week-4	Operators and expressions	4	2	-	2	a1, a2, a3, a4, b1, b2
Week5	Control structures (if-else, loops, etc.)	4	2	-	2	a1, a2, a3, a4, b1, b2, c1, c2
Week-6	Functions and Procedures	4	2	-	2	a1, a2, a3, a4, b1, b2, c1, c2
Week-7	Midterm Revision and reminder	4	2	-	2	a1, a2, a3, a4, b1, b2, c1
Week-8	Midterm Exam.					



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Course Specification

Week-9	Modular Programming Concepts	4	2	-	2	a1, a2, a3, a4, b1, b2, c2
Week-10	Data Structures	4	2	-	2	a1, a2, a3, a4, b1, b2, c2
Week-11	Arrays and Lists - 1	4	2	-	2	a1, a2, a3, a4, b1, b2, c2
Week-12	Arrays and Lists - 2	4	2	-	2	a1, a2, a3, a4, b1, b2, c2
Week-13	Strings and File Handling	4	2	-	2	a1, a2, a3, a4, b1, b2, c2
Week-14	Lab Exam					

6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓			✓	✓								



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5 %
2	Quiz 2 written (Semester work)	11	5	5 %
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10 %
6	Final Oral Exam	0	0	0
7	Assignments / Project	weekly	10	10 %
8	Field training	0	0	0
9	Other (Mention)	0	0	0

8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Introduction to Programming Using Python Introduction to Programming Using Python is intended for use in the introduction to programming course. Daniel Liang (2021).
	Other References	Introduction to Programming in Python, Xin Huang, 2022.
	Electronic Sources (Links must be added)	Journal of Computer Programming.
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Sarah Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

Course Code: CS 104

Course Name: Introduction to Information Systems

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level one		
Term/ Academic year	Feb.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 101							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. RANIA RAGAB HUSSEIN					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course introduces information systems, organizational strategy, competitive advantage, and information systems, ethics and privacy, information security, data and knowledge Management, telecommunications and networking, information systems within the organization, Customer relationship management and supply chain management. acquiring information systems and applications.



3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a1. Recognize the ingredients of management knowledge.
- a2. Recognize the synthesis of technological and business knowledge to develop and integrate effective IS solutions that support management decision making and organizational strategies.
- a3. Recognize and analyze problems in organizational situations and select and defend a course of action.
- a4. Define the necessary for success in the management of information technology

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Discuss and analyze ethical problems in organizational situations and select and defend a course of action.
- b2. Explains Information Systems: Concepts and Management.
- b3. Illustrate Data and Knowledge Management, critical thinking and problem-solving skills when analyzing and solving information system and business problems.
- b4. Explain the Organization of Information Systems.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Use the knowledge of information systems to implement strategic support organization's objectives.
- c2. Choose appropriate Information Systems and Applications according to their needs.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Prepare an assignment and project report.
- d2. Communicate effectively with complex information systems and business concepts orally and in writing.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a2
A11	Requirements, practical constraints, and computer-based systems.	a3
A14	Demonstrating basic knowledge and understanding of the core of analysis, algebra, applied mathematics and statistics.	a4
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b2
B12	Perform classifications of (data, results, methods, techniques, algorithms. etc.).	b3
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b4
C4	Apply computing information retrieval skills in computing community environment and industry.	c1
C16	Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.	c2
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1
D2	Demonstrate skills in group work, team management, time management and organizational skills.	d2



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5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs.</i>			ILOs Covered by Course
			Lec.	Tut.	Lab.	
<i>Week -1</i>	Introduction to Information systems, Foundations of Information Systems in Business,	4	2	0	2	a1, b1, b2, b4
<i>Week-2</i>	Information Technologies: Computer Hardwar	4	2	0	2	a2, b2
<i>Week-3</i>	Information Technologies: Computer Software	4	2	0	2	a2, b2
<i>Week-4</i>	Data Resource and knowledge Management	4	2	0	2	a1, a2, b2
<i>Week5</i>	Telecommunications and Networks	4	2	0	2	a1, a2, b2
<i>Week-6</i>	Competitive Advantage and Electronic Business Systems	4	2	0	2	a3, a4, b3, b4
<i>Week-7</i>	Revision	4	2	0	2	
<i>Week-8</i>	Midterm Exam.					
<i>Week-9</i>	Customer Relations management and Electronic Commerce Systems	4	2	0	2	a3, a4, b3, b4
<i>Week-10</i>	Information systems and applications, Decision support system (DSS), building DSS, application of DSS	4	2	0	2	a3, a4, b3, b4
<i>Week-11</i>	Organizational Strategy, Developing Business/IT Solutions	4	2	0	2	a3, a4, b3, b4
<i>Week-12</i>	Information Security, Ethical and privacy Challenges	4	2	0	2	a3, a4, b3, b4
<i>Week-13</i>	Enterprise and Global Management of Information Technology	4	2	0	2	a3, a4, b3, b4
<i>Week-14</i>	Lab examination	4	2	0	2	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brainstorming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√					√	√		√						

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	5	5%
2	Quiz 2 written (Semester work)	10	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	
7	Assignments / Project	All weeks	10	10%
8	Field training	-	0	
9	Other (Mention)	-	0	



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Information Systems: A Manager's Guide to Harnessing Technology (9th Edition) by John Gallaugher (2021)
	Other References	- Business Driven Information Systems (7th Edition) by Paige Baltzan (2022) - Information Systems for Business and Beyond (2020) by David Bourgeois
	Electronic Sources (Links must be added)	-----
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



اسم المقرر: إدارة الأعمال

كود المقرر: H 103

القسم القائم بتدريس المقرر	علوم الحاسب

1- معلومات أساسية :

نوع المقرر	اجباري	الفرقة الدراسية / المستوى الدراسي الذي يقدم فيه المقرر	المستوى الاول
العام الأكاديمي الفصل الدراسي	2026/2025	أكتوبر	2 ساعة
ساعات الإتصال:	المحاضرة: 2	التمارين:	-
المتطلب السابق:	-	المعامل:	إجمالي 2
المعايير الأكاديمية	NARS 2018		
تاريخ الموافقة على اللائحة	2001		
منسق المقرر	د/محمد أبو زيد		
تاريخ اعتماد توصيف المقرر	2025/8/20		
جهة مناقشة واعتماد توصيف المقرر	مجلس/ القسم		

2. الوصف العام للمقرر:

يوفر هذا المقرر فهماً لمفاهيم المحاسبة والاقتراضات والمبادئ. يغطي تحليل وتسجيل المعاملات التجارية؛ عملية التسويات؛ وإجراءات إتمام الدورة المحاسبية. يتقدم إلى توضيح العمليات التجارية ومحاسبة مخزون البضائع؛ ويغطي الرقابة الداخلية والنقد؛ ويشرح الإجراءات المحاسبية للذمم المدينة.

3. مخرجات التعلم المستهدفة:

أ - المعرفة والفهم:

- أ. يعرف الطالب مفهوم الإدارة وأهدافها وخاصة إدارة الأعمال.
- أ. بعد الطالب للعب الأدوار الإدارية والقيادية.
- أ. بعد الطالب ليكون من رواد الأعمال في المستقبل.

ب - المهارات الذهنية:

- ب. القدرة على بناء استراتيجيات وخطط عمل.
- ب. يستطيع على بناء علاقات عمل جيدة وناجحة.
- ب. يتمكن من بناء فرق عمل.



ج - المهارات المهنية:

- ج.1 القدرة على بناء فرق عمل.
- ج.2 القدرة على إدارة مشروعات.
- ج.3 اكتساب مهارات حل المشكلات والتكامل مع الآخرين.

د- المهارات العامة:

- د.1 يستطيع تحليل المشكلات واقتراح الحلول خاصة في مجال العمل.
- د.2 ينفذ مهارة التفكير المنظم وترتيب الأولويات

4. مساهمة المقرر في اهداف التعلم المستهدفة من البرنامج:

اتساق مخرجات التعلم المستهدفة مع مخرجات البرنامج

مخرجات التعلم المستهدفة	مخرجات البرنامج / المعايير الأكاديمية المتبناة (التي يحققها المقرر تبعاً للمصنوفة في توصيف البرنامج)	
	النص	الكود
a1	الحقائق والمفاهيم والمبادئ والنظريات الأساسية المتعلقة بالحوسبة والمعلومات وتطبيقات الكمبيوتر.	A1
a2	الأدوات والممارسات والمنهجيات المستخدمة في تحديد وتصميم وتنفيذ وتقييم أنظمة البرمجيات الحاسوبية.	A3
a3	القضايا المهنية والأخلاقية والأخلاقية المرتبطة باستغلال تكنولوجيا الكمبيوتر.	A9
b1	- إدراك المفاهيم والمبادئ والنظريات والممارسات وراء الحوسبة والمعلومات كمتخصص أكاديمي.	B2
b2	تحليل واقتراح وتقييم أنظمة وعمليات الكمبيوتر البديلة مع الأخذ بعين الاعتبار القيود والقيود النوعية.	B4



5. محتوى المقرر:

مخرجات التعلم المستهدفة المغطاة بواسطة المقرر	ساعات الإتصال			مجموع الساعات	الموضوع	رقم الإِسبوع
	معمل	حصص تمارين	محاضر ة			
أ.1	--	--	2	2	تهيئة وتعريف بالمقرر بصفة عامة.	الإِسبوع-1
أ.1 - أ.2 - ب.1	--	--	2	2	تعريف مفهوم الإدارة وأنواعها.	الإِسبوع-2
أ.2 - ب.2-ج.3	--	--	2	2	تعريف أعمال الإدارة.	الإِسبوع-3
أ.3 - ج.3- د.1	--	--	2	2	الإدارة معارف وفنون.	الإِسبوع-4
أ.3 - ب.3-ج.2	--	--	2	2	الفرق بين الإدارة العامة وإدارة الأعمال (1)	الإِسبوع-5
ب.2 - ج.1-ج.3	--	--	2	2	الفرق بين الإدارة العامة وإدارة الأعمال (2)	الإِسبوع-6
ج.2 - د.2	--	--	2	2	مقارنة بين المدير والقائد	الإِسبوع-7
إمتحان نصف الفصل						الإِسبوع-8
ج.1-ج.3-د.1- د.2	--	--	2	2	(1)القيادة تعريفها وأهميتها وصفات القائد	الإِسبوع-9
ج.1-ج.3-د.1- د.2	--	--	2	2	(2)القيادة تعريفها وأهميتها وصفات القائد	الإِسبوع-10
ج.1-ج.3-د.1- د.2	--	--	2	2	(1)المهارات الأساسية للقائد	الإِسبوع-11
ب.3-د.2	--	--	2	2	(2)المهارات الأساسية للقائد	الإِسبوع-12
ب.3-د.2	--	--	2	2	(3)المهارات الأساسية للقائد	الإِسبوع-13
ب.1-ج.1-ج.3- د.1-د.2	--	--	2	2	مراجعة نهائية	الإِسبوع-14



6. طرق التعليم و التعلم للمقرر:

التدريس المباشر		التدريس الغير مباشر										استراتيجيات التعلم بمساعدة تكنولوجيا المعلومات			
المحاضرات	العملية والتجارب التمارين	العصف الذهني	الجماعية المشروعات على القائم التعلم	الحالة دراسة استراتيجية	حل المشكلات	الأبحاث /التقارير كتابة	و المناقشة الحوار	الميداني التدريب	الميدانية الزيارات	التعلم الذاتي	التعلم بالإكتشاف	النمذجة أو المحاكاة برامج	الافتراضية المعامل	التعلم الإلكتروني	النقاء الإصطناعي في التعليم
√		√				√	√			√					

7. طرق تقييم الطلاب:

م	طرق التقييم *	توقيت التقييم المتوقع (رقم الأسبوع الدراسي)	درجات التقييم	النسبة المئوية من إجمالي درجة المقرر
1	امتحان 1 تحريري (أعمال سنة)	إسبوعيا	10	10 %
2	امتحان 2 تحريري (أعمال سنة)	طبقا للتوقيت المحدد	10	10 %
3	امتحان منتصف الفصل الدراسي	8	20	20 %
4	امتحان نهائي تحريري	15 و 16	60	60 %
5	امتحان نهائي عملي	14	-	-
6	امتحان نهائي شفوي			
7	تكليفات / مشروع			
8	تدريب ميداني			
9	أخرى (تذكر)			



8. مصادر التعلم والتسهيلات المادية:

• حمد سيد مصطفى /الإدارة الإستراتيجية: دليل المدير العربي التفكير والتغيير الإستراتيجي، القاهرة: المؤلف نفسه، 2005. • هليل عبد المولى /أساسيات في القيادة والإدارة، عمان: دار الكندي، الطبعة الأولى، 2005. • تشارلز هل، جاريث جونز /الإدارة الاستراتيجية: مدخل متكامل، ترجمة: د. رفاعي محمد رفاعي، د. محمد سيد أحمد عبد المتعال، الرياض: دار المريخ للنشر. • طاهر مرسي عطية /أساسيات إدارة الأعمال الدولية، القاهرة: دار النهضة العربية، 2001.	المرجع الأساسي للمقرر (لابد من كتابة البيانات كاملة وفقا لطريقة توثيق علمي)	مصادر التعلم (الكتب والمراجع العلمية وغيرها) *
فوزية عبد مبروك وآخرون- نظم تكنولوجيا المعلومات وتطبيقاتها في إدارة الأعمال. القاهرة: الناشر غير مبين، 2005.	المراجع الأخرى	
https://www.hindawi.org/books/93141694/	المصادر الالكترونية (لابد من إضافة الروابط)	
Microsoft Teams	المنصة التعليمية (لابد من إضافة الرابط)	
الحاسوب	الأجهزة	التجهيزات التعليمية المساعدة للتعليم والتعلم *
العرض التقديمي بمساعدة الحاسوب الواح الكتابة البيضاء	المستلزمات	
(Word ، عرض، ومستندات PDF ملف) ملاحظات المحاضر	أخرى (تذكر)	

منسق البرنامج	منسق المقرر	
د/ رانيا رجب	د/محمد أبو زيد	الإسم
		التوقيع



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

Course Code: BS 101

Course Name: Calculus

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught		Level 1	
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:		3	
Contact Hours	Lecture:	2	Tutorial:	2	Lab.:	--	Total	4
Pre-Requisite	None							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Mohamed Abozeid					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course covers the following topics: real numbers and functions, inequalities and absolute values, the domain and the range of a function, operations and properties of functions, composite functions, even and odd functions, increasing and decreasing functions, the inverse functions, limits and continuity of functions, differentiation (derivatives of exponential, logarithmic, trigonometric, inverse trigonometric functions), integration, definite integrals and applications of the integration, multivariable functions, partial derivatives, extreme values for several variables.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1 Understand essentials of Algebra and function.
- a.2 Recognize concepts of transcendental functions.
- a.3 Know Limits and Continuity.
- a.4 Demonstrate basic Knowledge derivatives and derivatives applications.
- a.5 Show critical understanding of inverse trigonometric functions.



a.6 Know and understand basic concepts of Integrals.

a.7 Identify the functions of several variables and their applications in differentiation.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

b1. Investigate the appropriate methods for solving the different types of problems.

b2. Analyze mathematical systems and proofs

b3. Determine the domain and the range of functions

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

c1. Employ gained skills in mathematics to create algorithms.

c2. Test the appropriate methods for evaluating differentiations and integrations.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

d1. Work effectively with others.

d2. Demonstrate ability to think critically.

d3. Present enormous confidence to the students in the computer and the results they give.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes.

Program ILOs		Course ILOs
Code	Text	
A14	Demonstrating basic knowledge and understanding of a core of analysis, algebra, applied mathematics and statistics.	a1,a2,a3,a4,a5,a6,a7
A12	Essential mathematics relevant to computer science.	
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b1,b2,b3
B12	Perform classifications of (data, results, methods, techniques, algorithms. etc.).	
C11	Perform independent information acquisition and management, using scientific literature and Web sources.	c1,c2
C15	Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.	
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1,d2,d3
D2	Demonstrate skills in group working, team management, time management and organizational skills.	
D3	Show the use of information-retrieval.	



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Properties of inequalities and properties of absolute values	4	2	2	0	a1,b3,c1,d1
Week-2	Intervals and distance formula.	4	2	2	0	a1,b3,c1,d1
Week-3	Transcendental functions	4	2	2	0	a2,b1,c1,d1
Week-4	Exponential and Trigonometric Logarithms functions	4	2	2	0	a2,b1,c1,d1
Week5	Limits	4	2	2	0	a3,b1,c1,d2
Week-6	Continuity	4	2	2	0	a3,b1,c1,d2
Week-7	Types of discontinuity	2			0	a3,b1,c1,d2
Week-8	Mid Term Exam					
Week-9	Derivatives and higher derivatives	4	2	2	0	a4,b2,c2,d2
Week-10	Derivative of the trigonometric funs. and the inverse trigonometric funs.	4	2	2	0	a4,a5,b2,c2,d2
Week-11	Applications of the Derivatives	4	2	2	0	a4,b2,c2,d2
Week-12	Functions of Several variables Partial Derivatives	4	2	2	0	a7,b2,c2,d3
Week-13	Chain rules and implicit diff. Directional derivative Extrema Values and Saddle points	4	2	2		a7,b2,c2,d2
Week-14	Integral and integrals applications	4	2	2		Integral and integrals applications Final written exam

6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓			✓	✓	✓		✓	✓	✓			✓	✓



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	5	5%
2	Quiz 2 written (Semester work)	10	5	5%
3	Midterm exam	8	20	20 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	--	0	0%
6	Final Oral Exam	--	0	0%
7	Assignments / Project	Weekly	10	10%
8	Field training	--	0	0%
9	Other (Mention)	--	0	0%

8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	James Stewart, "Calculus", 8th Edition, 2015.
	Other References	H. Anton, I. Bivens and S. Davis, "Calculus", 10th Edition, 2012.
	Electronic Sources (Links must be added)	https://pdfcoffee.com/calculus-8th-pdf-free.html chrome-extension://efaidnbmnnnibpcajpcgiclfindmkaj/https://3lih andam69.wordpress.com/wp-content/uploads/2018/10/calculus-10th-edition-anton.pdf
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Mohamed Abozeid	Dr. Rania Ragab Hussien
Signature		



Course Code: BS 102

Course Name: Linear Algebra

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught		Level 1	
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:		3	
Contact Hours	Lecture:	2	Tutorial:	2	Lab.:	--	Total	4
Pre-Requisite	BS 101 (Calculus)							
Academic standards				NARS 2010				
Bylaw Approval				2022				
Course Coordinator				Dr. Mohamed Abozeid				
Course Specification Approval				Department Council				
Course Specification Approval Date				20/8/2025				

2. Course Overview:

This course covers the following topics: Linear systems and matrices, introduction to linear systems, Gauss-Jordan elimination, matrix operations, inverses of matrices, determinants and elementary row operations, Cramer's rule and inverse matrices, vectors in the plane and in space, vector spaces, the vector spaces R^2 , the vector space R^3 , Linear combination, orthogonally and the Dot product, eigenvalues and eigenvectors, Diagonalizable matrices.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1 Define matrices, echelon form, row canonical form, row equivalence and elementary row operations.
- a.2 Discuss gaussian elimination algorithm.
- a.3 Define determinants, minors, cofactors and adjoint matrix
- a.4 Define vector spaces, subspaces, linear combinations and spans
- a.5 Know the conditions of the inner product space.
- a.6 Summarize the eigen values and eigen vectors



b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Analyze elementary row operations for gaussian elimination algorithm.
- b2. Distinguish between matrices and determinants.
- b3. Explain vector spaces, subspaces and inner product space
- b4. Evaluate the diagonalization of matrices.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Apply the matrices and vector spaces in computer science, artificial intelligence, and mathematics.
- c2. Solve the systems of linear equations.
- c3. Examine skills regarding eigen values and eigen vectors.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Work in a team group.
- d2. Demonstrate the gained knowledge orally.
- d3. Reveal problems related to computer science.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes.

Program ILOs		Course ILOs
Code	Text	
A14	Demonstrating basic knowledge and understanding of a core of analysis, algebra, applied mathematics and statistics.	a1,a2,a3,a4,a5,a6
A12	Essential mathematics relevant to computer science.	
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b1,b2,b3,b4
B12	Perform classifications of (data, results, methods, techniques, algorithms. etc.).	
C11	Perform independent information acquisition and management, using scientific literature and Web sources.	c1,c2,c3
C15	Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.	
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1,d2,d3
D2	Demonstrate skills in group working, team management, time management and organizational skills.	
D3	Show the use of information-retrieval.	



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Matrices, Matrix Multiplication, Transpose of a Matrix and Partitioned Matrices, Echelon Form, Row Canonical Form, Row Equivalence and Elementary Row Operations.	4	2	2		a1,b2,c1
Week-2	Square Matrices, Diagonal and Trace, Identity matrix, Powers of Matrices and Polynomials in matrices, Invertible (Non-Singular) Matrices, Special Types of Square Matrices and Gaussian Elimination Algorithm for Inverse.	4	2	2		a1,a2,b1,c1
Week-3	Determinants, Properties of Determinants, Minors, Cofactors and Adjoint matrix	4	2	2		a3,b2,c1
Week-4	Solution of Systems of Linear Equations, Gauss-Jordan method, Matrix Inversion method and Cramer's Rule.	4	2	2		a1,a2,a3,b1,b2,c1,c2
Week5	Vector Spaces	4	2	2		a4,b3,c1
Week-6	Subspaces, Linear Combinations and Spans.	4	2	2		a4,b3,c1
Week-7	Linear Dependence, Linear Independence, Basis and Dimensions	4	2	2		a4,b3,c1
Week-8	Midterm Exam					
Week-9	Row Space, Column Space, Null Space, Rank and Nullity	4	2	2		a4,b3,c1
Week-10	Inner Product Spaces	4	2	2		a4,a5,b3,c1
Week-11	Length, Distance and Orthogonality in Inner Product Spaces and Cauchy-Schwarz Inequality	4	2	2		a4,a5,b3,c1
Week-12	Eigenvalues and Eigenvectors	4	2	2		a6,b4,c3
Week-13	Diagonalization	4	2	2		a6,b4,c3
Week-14	Revision	4	2	2		a1,a2,a3,a4,a5,a6,b1,b2,b3,c1,c2,c3,d1,d2,d3



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓			✓	✓	✓		✓	✓	✓			✓	✓

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	5	5%
2	Quiz 2 written (Semester work)	10	5	5%
3	Midterm exam	8	20	20 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	--	0	0%
6	Final Oral Exam	--	0	0%
7	Assignments / Project	Weekly	10	10%
8	Field training	--	0	0%
9	Other (Mention)	--	0	0%

8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	H. Anton and C. Rorres, “ <i>Elementary Linear Algebra</i> ” 11 th Edition, 2014.
	Other References	H. Anton, I. Bivens and S. Davis, “ <i>Calculus</i> ” 10 th Edition, 2012.
	Electronic Sources (Links must be added)	chrome-extension://efaidnbmnnnibpcajpcgicfindmkaj/https://faculty.ksu.edu.sa/sites/default/files/Book_H_Anton_11_Ed_Linear_Algebra.pdf chrome-extension://efaidnbmnnnibpcajpcgicfindmkaj/https://3lihandam69.wordpress.com/wp-content/uploads/2018/10/calculus-10th-edition-anton.pdf
	Learning Platforms	Microsoft Teams



	(Links must be added)	
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Mohamed Abozeid	Dr. Rania Ragab Hussien
Signature		



Course Code: BS 105

Course Name: Statistics and Probabilities

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught		Level 1	
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:		3	
Contact Hours	Lecture:	2	Tutorial:	2	Lab.:	--	Total	4
Pre-Requisite	BS 101 (Calculus)							
Academic standards				NARS 2010				
Bylaw Approval				2022				
Course Coordinator				Dr. Mohamed Abozeid				
Course Specification Approval				Department Council				
Course Specification Approval Date				20/8/2025				

2. Course Overview:

This course gives an introduction to probability theory and mathematical statistics that emphasizes the probabilistic foundations required to understand probability models and statistical methods. Topics covered will include the probability axioms, Conditional probability, Probability with counting rules, discrete and continuous random variables, probability distributions, mathematical expectation, common families of probability distributions, and the central limit theorem, correlation and regression. Most of exercises are related to the computer applications.

3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1 Define the random experiment, sample space, event, probability of an event, operations on events, axioms on probability, conditional probability.
- a.2 List counting sample points.
- a.3 Display Bayes' formula.
- a.4 Define discrete and continuous random variables.
- a.5 Classify types of discrete and continuous probability distributions.
- a.6 Discuss the correlation and regression coefficients.



b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Evaluate the probabilities of relative computer science problems.
- b2. Distinguish between types of counting rules.
- b3. Explain discrete and continuous random variables and their distributions.
- b4. Analyze statistical problems via correlation and regression coefficients.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Apply the axioms of probabilities and counting rules on probability experiments.
- c2. Use the probability distributions for solving computer science problems.
- c3. Examine skills regarding correlation and regression coefficients.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Work in a team group.
- d2. Demonstrate the gained knowledge orally.
- d3. Reveal problems related to computer science.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes.

Program ILOs		Course ILOs
Code	Text	
A14	Demonstrating basic knowledge and understanding of a core of analysis, algebra, applied mathematics and statistics.	a1,a2,a3,a4,a5,a6
A12	Essential mathematics relevant to computer science.	
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b1,b2,b3,b4
B12	Perform classifications of (data, results, methods, techniques, algorithms. etc.).	
C11	Perform independent information acquisition and management, using scientific literature and Web sources.	c1,c2,c3
C15	Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.	
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1,d2,d3
D2	Demonstrate skills in group working, team management, time management and organizational skills.	
D3	Show the use of information-retrieval.	



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Random experiment, Sample space, Event, Probability of an event, Operations on events, Axioms on probability.	4	2	2		a1,b1,c1
Week-2	Counting sample points, Multiplication rule, Addition rule, Permutations, Combination.	4	2	2		a2,b2,c1
Week-3	Conditional probability, Bayes' formula.	4	2	2		a1,a3,b1,b2,c1
Week-4	Probability of systems.	4	2	2		a1,a2,a3,b1,b2,c1
Week5	Random variables, Discrete random variables, Discrete probability distribution, Cumulative distribution function.	4	2	2		a4,b3,c2
Week-6	Continuous random variables, Continuous probability distribution, Cumulative distribution function.	4	2	2		a4,b3,c2
Week-7	Expectations and moments.	4	2	2		a4,b3,c2
Week-8	Midterm Exam					
Week-9	Discrete probability distributions, Binomial distribution, Poisson distribution.	4	2	2		a5,b3,c2
Week-10	Continuous probability distributions, Uniform distribution, Normal distribution.	4	2	2		a5,b3,c2
Week-11	Standard normal distribution	4	2	2		a5,b3,c2
Week-12	Correlation coefficient, Persons' coefficient, Spearman coefficient.	4	2	2		a6,b4,c3
Week-13	Regression coefficient, Regression equation Y on X, Regression equation X on Y.	4	2	2		a6,b4,c3
Week-14	Revision	4	2	2		a1,a2,a3,a4,a5,a6,b1,b2,b3,b4,c1,c2,c3



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓			✓	✓	✓		✓	✓	✓			✓	✓

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	5	5%
2	Quiz 2 written (Semester work)	10	5	5%
3	Midterm exam	8	20	20 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	--	0	0%
6	Final Oral Exam	--	0	0%
7	Assignments / Project	Weekly	10	10%
8	Field training	--	0	0%
9	Other (Mention)	--	0	0%

8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying Ye, “ <i>Probability & Statistics for Engineers & Scientists</i> ” 9 th Edition, 2012.
	Other References	George C. Runger, Douglas C. Montgomery, “ <i>Applied Statistics and Probability for Engineers</i> ” 7 th Edition, 2014.
	Electronic Sources (Links must be added)	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.uoanbar.edu.iq/eStoreImages/Bank/9223.pdf chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://kolegite.com/E_E_library/books_and_lectures/%D0%9C%D0%B0%D1%82%D0%B5%D0%BC%D0%B0%D1%82%D0%B8%D0%BA%D0%B0/Douglas%20C.%20Montgomery%2C%20George%20C.%20Runger%20-



Supportive facilities & equipment for teaching and learning *		%20Applied%20Statistics%20and%20Probability%20for%20Engineers-Wiley%20%282018%29.pdf
	Learning Platforms (Links must be added)	Microsoft Teams
	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Mohamed Abozeid	Dr. Rania Ragab Hussien
Signature		



Course Code: H 201

Course Name: Work Ethics

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Choose an item.				Academic level at which the course is taught		2 nd level	
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:		2	
Contact Hours	Lecture:	2	Tutorial:		Lab.:		Total	2
Pre-Requisite								
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Mohamed Abozeid					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course covers Identify and comprehend traditional and current issues in Ethics. Define the main areas of ethical discourse. Discuss theories of ethics: teleological and deontological. Develop skills of critical ethical analysis of contemporary moral problems. Foundations of intellectual property, Ownership of information, Copyrights, patents, trademarks and trade secrets, Software piracy ,Telecommunications; IT profession; IT education; Artificial intelligence ethics.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1.a.1 Understand Essential facts, concepts, principles, and theories relating to computing and
- a.2.information and computer applications.



- a.3.a.2 Know criteria and specifications appropriate to specific problems, and plan strategies
- a.4. for their solution.
- a.5.a.3 Know professional, moral, and ethical issues involved in the exploitation of computer technology and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.
- a.6.a.4 List tools, practices, and methodologies used in the specification, design, implementation and evaluation of ethical computer software systems.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1 Realize the concepts, principles, theories, and practices behind computing and information.
- b.2 Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.
- b.3 Recommend the professional, legal, moral, and ethical issues relevant to the Ways of life.
- b.4 Perform classifications of (data, results, methods, techniques).
- b.5 Evaluate reports in a range of knowledge areas.
- b.6 Evaluate the results of moral tests to investigate the functionality of computer area.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1 Apply computing information retrieval skills in computing community environment and industry.
- c.2 Build a mass of diverse data, assess risk, and draw conclusions.
- c.3 Communicate effectively by oral, written, and visual means.
- c.4 Develop a range of fundamental research skills, using online resources, technical repositories and library-based material

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1 Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.
- d.2 Show the use of information-retrieval.
- d.3 Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a1,a4
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a2,a4
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a1,a2
A9	Professional, moral, and ethical issues involved in the exploitation of computer technology and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.	a3
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b2
B6	Evaluate the results of tests to investigate the functionality of computer systems.	b4,b5,b6
B8	Familiar with the professional, legal, moral, and ethical issues relevant to the computing industry.	b3
B9	Evaluate research papers in a range of knowledge areas	b4,b5,b6
B12	Perform classifications of (data, results, methods, techniques, algorithms. etc.).	b4
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c1
C4	Apply computing information retrieval skills in computing community environment and industry.	c1
C5	Develop a range of fundamental research skills, using online resources, technical repositories and library-based material	c4
C8	Handle a mass of diverse data, assess risk and draw conclusions.	c2
D5	Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.	d1,d3
D7	Show the use of general computing facilities.	d3
D8	Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.	d1,d3



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Ethics and work ethics definition ,employer's expectation of employees	2	2			a1, b1
Week-2	Behaviors, Attitudes, Work Ethics & DECISION MAKING	2	2			a2, b2, c2
Week-3	Ethics and the Teaching Profession: Why what we value, think and do really matters.	2	2			a3,b2, c3
Week-4	Professional Ethics	2	2			b3, c2, d1
Week5	Professionalism in the workplace	2	2			b2, c3, d1
Week-6	Computer ethics (definition, bad effect of new technology in society)	2	2			b4, c2, a2
Week-7	Revision	2	2			b3, c2, d2
Week-8	Midterm Exam.					
Week-9	Principles of computer ethics And artificial intelligence	2	2			b3, c3, d2
Week-10	Ethics for IT workers and IT users	2	2			b4, c2, d2
Week-11	IT professionals	2	2			a3, b3, c2, d1
Week-12	Relationship between IT workers and employers, clients, suppliers, other professionals,	2	2			a4, b4, c2, d1
Week-13	Relationship between IT workers and IT users, society	2	2			a4, b5, c3, d2
Week-14	Professional codes of ethics.	2	2			a4, b6, c4, d3



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	3	10	10%
2	Quiz 2 written (Semester work)	11	10	10%
3	Midterm exam	8	20	20 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam		0	
6	Final Oral Exam		0	
7	Assignments / Project		0	
8	Field training		0	
9	Other (Mention)		0	



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	• Ethics In the Workplace by Dean Bredeson, Cengage Learning Publisher, 3rd edition, 2022.
	Other References	• Working Ethics: How to Be Fair in a Culturally C... by Rowson, Richard Paperback
	Electronic Sources (Links must be added)	https://www.peoplehum.com/glossary/what-is-work-ethics
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Mohamed Abozeid	Dr. Rania Ragab Hussien
Signature		



اسم المقرر: H 202

كود المقرر: حقوق انسان

القسم القائم بتدريس المقرر	علوم حاسب

1- معلومات أساسية :

نوع المقرر	Choose an item.		الفرقة الدراسية / المستوى الدراسي الذي يقدم فيه المقرر		الفرقة/المستوي الثاني	
العام الأكاديمي الفصل الدراسي	2026/2025	فبراير	عدد الساعات المعتمدة	2		
ساعات الإتصال:	المحاضرة: 2	التمارين:	المعامل:	إجمالي	2	
المتطلب السابق:						
المعايير الأكاديمية	NARS 2018					
تاريخ الموافقة على اللائحة	2022					
منسق المقرر	Dr. Mohamed Abozeid					
تاريخ اعتماد توصيف المقرر	2025/8/20					
جهة مناقشة واعتماد توصيف المقرر	مجلس/ القسم					

2. الوصف العام للمقرر:

يقدم هذا المقرر مقدمة لفلسفة حقوق الإنسان الأساسية والمبادئ والأدوات والمؤسسات ذات الصلة، كما يقدم نظرة عامة على القضايا والنقاشات الحالية في هذا المجال مع التركيز على المشكلات. يهدف هذا المقرر إلى استكشاف بعض جوانب القانون الدولي لحقوق الإنسان، الذي أصبح متنوعاً ومعقداً بشكل متزايد، وله تطبيقات على الصعيدين الوطني والدولي. كما يسعى المقرر إلى تحليل الطرق التي يتم بها التعامل مع ادعاءات انتهاكات حقوق الإنسان في المحاكم البلغارية وتأثير الخطاب المتعلق بحقوق الإنسان على السياسة والعلاقات الدولية.

3. مخرجات التعلم المستهدفة:

أ- المعرفة والفهم:

أ. 1 يعرف الطالب مفهوم حقوق الإنسان.

أ. 2 يعرف الطالب أنواع حقوق الإنسان

أ. 3 يعرف الطالب تاريخ فكرة حقوق الانسان.



ب - المهارات الذهنية:

- ب.1 يقدر على التواصل الجيد مع الآخرين المبني على حقوق الانسان.
- ب.2 يستطيع بناء علاقات عمل جيدة وناجحة تراعي حقوق الانسان.
- ب.3 يتمكن من المقارنة بين الواقع والمأمول في مجال حقوق الانسان.

ج - المهارات المهنية:

- ج.1 يقدر على بناء تحالفات عمل متوازنة
- ج.2 يمتلك مهارة التعامل مع الموظفين والعملاء بعدل وانصاف.
- ج.3 يكتسب مهارة حل المشكلات والتكامل مع الآخرين.

د- المهارات العامة:

- د.1 يستطيع الطالب تحليل المشكلات واقتراح الحلول خاصة في مجال العمل
- د.2 يتقن الطالب مهارة التفكير المنظم وترتيب الأولويات
- د.3 يستطيع الطالب التواصل الجيد مع الآخرين والعمل من خلال فريق عمل.

4. مساهمة المقرر في اهداف التعلم المستهدفة من البرنامج:

اتساق مخرجات التعلم المستهدفة مع مخرجات البرنامج

مخرجات التعلم المستهدفة	مخرجات البرنامج / المعايير الأكاديمية المتبناة (التي يحققها المقرر تبعاً للمصفوفة في توصيف البرنامج)	
	النص	الكود
أ.1	النمذجة وتصميم الأنظمة المعتمدة على الحاسوب مع الأخذ بعين الاعتبار التنازلات.	2أ
أ.2	المعايير والمواصفات المناسبة للمشاكل المحددة، والتخطيط لاستراتيجيات حلها.	4أ
أ.3	القضايا المهنية والأخلاقية والقيمية المتعلقة باستغلال تكنولوجيا الكمبيوتر، والاسترشاد بالممارسات المهنية والأخلاقية والقانونية المناسبة ذات الصلة بصناعة الحوسبة والمعلومات.	9أ
ب.1	إدراك المفاهيم والمبادئ والنظريات والممارسات وراء الحوسبة والمعلومات كتخصص أكاديمي.	2ب
ب.2	تقديم أفكار ومقترحات وتصميمات باستخدام الحجج العقلانية والمقولة لعرض أنظمة الحوسبة.	5ب
ب.3	تقييم نتائج الاختبارات للتحقيق في وظائف أنظمة الكمبيوتر.	6ب
ج.1	تنفيذ المعرفة والمهارات الحاسوبية الشاملة في المشاريع وفي نشر أجهزة الكمبيوتر لحل المشاكل العملية.	2ج
ج.2	تطبيق مهارات استرجاع المعلومات الحاسوبية في بيئة مجتمع الحوسبة والصناعة.	4ج
ج.3	التعامل مع كمية كبيرة من البيانات المتنوعة وتقييم المخاطر واستخلاص النتائج.	8ج
د.1	إظهار مهارات الحساب المناسبة في فهم وتقديم الحالات التي تنطوي على بعد كمي.	5د
د.2	إظهار استخدام مرافق الحوسبة العامة.	7د
د.3	إظهار التقدير لضرورة مواصلة التطوير المهني اعترافاً بمتطلبات التعلم مدى الحياة.	8د



5. محتوى المقرر:

مخرجات التعلم المستهدفة المغطاة بواسطة المقرر	ساعات الإتصال			مجموع الساعات	الموضوع	رقم الإسموع
	معمل	حصص تمارين	محاضرة			
أ1	0	0	2	2	النظام القانوني لقواعد حماية حقوق الإنسان	الإسموع-1
أ2	0	0	2	2	القواعد العامة لفكرة حقوق الإنسان	الإسموع-2
ب1	0	0	2	2	التطور التاريخي لفكرة حقوق الإنسان	الإسموع-3
أ3	0	0	2	2	تعريف حقوق الإنسان	الإسموع-4
ب2	0	0	2	2	خصائص و مبادئ حقوق الإنسان	الإسموع-5
ب2	0	0	2	2	مصادر حقوق الإنسان	الإسموع-6
ج1	0	0	2	2	أنواع حقوق الإنسان	الإسموع-7
إمتحان منتصف الفصل						الإسموع-8
أ1	0	0	2	2	الحقوق الفردية و الحقوق السياسية والاقتصادية والاجتماعية والثقافية	الإسموع-9
أ2	0	0	2	2	الحقوق الجماعية -حقوق الشعوب	الإسموع-10
ب3	0	0	2	2	واجبات الأفراد والتزاماتهم في المجتمع	الإسموع-11
ج3	0	0	2	2	مكافحة الفساد أنواع وصور الفساد	الإسموع-12
ج2	0	0	2	2	أسباب الفساد وآثاره ووسائل مجابهته	الإسموع-13
	0	0	2	2	مراجعة نهائية	الإسموع-14

6. طرق التعليم و التعلم للمقرر:

التدريس المباشر		التدريس الغير مباشر										استراتيجيات التعلم بمساعدة تكنولوجيا المعلومات			
المحاضرات	العملية والتجارب التمارين	العصف الذهني	الجماعية المشروعات على القائم التعلم	الحالة دراسة استراتيجية	حل المشكلات	الأبحاث /التقارير كتابية	و المناقشة الحوار	الميداني التدريب	الميدانية الزيارات	التعلم الذاتي	التعلم بالإكتشاف	النمذجة أو المحاكاة برامج	الافتراضية المعامل	التعلم الإلكتروني	النقاء الإصطناعي في التعليم
✓	✓	✓	✓	✓	✓		✓			✓	✓				

7. طرق تقييم الطلاب:

م	طرق التقييم *	توقيت التقييم المتوقع (رقم الأسبوع الدراسي)	درجات التقييم	النسبة المئوية من إجمالي درجة المقرر
1	امتحان 1 تحريري (أعمال سنة)	6	10	10 %
2	امتحان 2 تحريري (أعمال سنة)	-	-	-
3	امتحان منتصف الفصل الدراسي	8	20	20 %
4	امتحان نهائي تحريري	15 و 16	60	60 %
5	امتحان نهائي عملي	-	-	-
6	امتحان نهائي شفوي	-	-	-
7	تكليفات / مشروع	10	10	10 %
8	تدريب ميداني	-	-	-
9	أخرى (تذكر)	-	-	-



8. مصادر التعلم و التسهيلات المادية:

• حقوق الانسان لذكريا المصري – دار الكتب القانونية 2006 • حقوق الانسان بين تعاليم الاسلام و اعلان الامم المتحدة لمحمد الغزالي	المرجع الأساسي للمقرر (لابد من كتابة البيانات كاملة وفقا لطريقة توثيق علمي)	مصادر التعلم (الكتب والمراجع العلمية وغيرها) *
• مقرر حقوق الإنسان ومكافحة الفساد • حقوق الانسان في الوطن العربي لحسين جميل مركز دراسات الوحدة العربية 2002م	المراجع الأخرى	
https://www.noor-book.com/tag/%D8%AD%D9%82%D9%88%D9%82-%D8%A7%D9%84%D8%A5%D9%86%D8%B3%D8%A7%D9%86	المصادر الالكترونية (لابد من إضافة الروابط)	
Microsoft Teams	المنصة التعليمية (لابد من إضافة الرابط)	
أجهزة الحاسوب	الأجهزة	التجهيزات التعليمية المساعدة للتعليم والتعلم *
ألواح الكتابة البيضاء	المستلزمات	
برنامج Microsoft Teams	أخرى (تذكر)	

منسق المقرر	منسق البرنامج	
Dr. Mohamed Abozeid	د/ رانيا رجب	الإسم
		التوقيع



Course Code: H 203

Course Name: Technical Report Writing

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught		Level 2	
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:		2	
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	-	Total	4
Pre-Requisite								
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Mohamed Abozeid					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course covers the difference between general writing and technical writing. It helps students demonstrate knowledge and understanding of presentation and writing skills for technical issues, word processing and scientific report, theses and plagiarism with particular emphasis on using computer technical terms.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Define essential facts, concepts, principles, and theories relating to technical writing, information and computer applications.
- a.2. List tools, practices, and methodologies in technical, research, and report writing.
- a.3. Know technical report mechanics.



b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1 Analyze technical reports and research papers.
- b.2 Generate ideas and write proposals using rational and reasoned arguments for presentation and report writing.
- b.3 Evaluate technical reports and investigate the functionality of the language in reflecting ideas.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1 Use proper mechanics in technical report writing.
- c.2 Apply citation and referencing rules.
- c.3 Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display digital literacy.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.
- d2. Demonstrate group work dynamics, self-regulation, time management and organizational skills.
- d3. Show research skills, information retrieval and presentation abilities.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1
A9	Professional, moral, and ethical issues involved in the exploitation of computer technology and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.	a1,a2,a3
A10	Current developments in computing and information research.	a3
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b2
B8	Familiar with the professional, legal, moral, and ethical issues relevant to the computing industry.	b1,b2
B9	Evaluate research papers in a range of knowledge areas	b3
C10	Communicate effectively by oral, written, and visual means.	c3
C11	Perform independent information acquisition and management, using scientific literature and Web sources.	c2
C12	Prepare and present seminars to a professional standard.	c3
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d2
D6	Reveal communication skills, public speaking and presentation skills, and delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.	d3



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	General Writing Vs. Technical Writing (definition, focus on, goals, how to achieve)	2	2	0	0	a1.a2.b3
Week-2	Building a Strong Outline	2	2	0	0	a1.a2.c3
Week-3	Researching the topic and Writing a First Draft	2	2	0	0	a1.b2.c3
Week-4	A Guideline to Writing a Technical Report	2	2	0	0	a3.b3.d3
Week5	Guideline to Writing a Technical Report Continued	2	2	0	0	a3.b3.d3
Week-6	Exercises and training on question types and an online quiz	2	2	0	0	a1.a3.b2.c3.d2
Week-7	Letter of Transmittal, Technical Presentation and Pitching	2	2	0	0	a2.a3.c2
Week-8	Midterm Exam.					
Week-9	Revising on a Guide Line to Writing a Technical Report and Starting Writing a New Report to Submitted online	2	2	0	0	c1.c2.d3
Week-10	Peer reviewing the technical reports	2	2	0	0	c2.c3.d2.d3
Week-11	Supplementary Material and Quiz	2	2	0	0	a1.a2.b2.c3.d3
Week-12	Technical Report Presentation	2	2	0	0	c1.c3.d1.d2
Week-13	Revision	2	2	0	0	a1.a2.a3.b1.b2.d4
Week-14	Lab exam					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√		√	√		√	√	√		√	√				

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	10	10%
2	Quiz 2 written (Semester work)	-	0	-
3	Midterm exam	8	20	20 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	-	0	-
6	Final Oral Exam	-	0	-
7	Assignments / Project	11	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	- Davies J.W. Communication Skills - A Guide for Engineering and Applied Science Students (12th ed., Prentice Hall, 2021) - van Emden J. Effective communication for Science and Technology (Palgrave 2001)
	Other References	- P van Emden J. A Handbook of Writing for Engineers 2nd ed. (Macmillan 2022) - van Emden J. and Eastal J. Technical Writing and Speaking, an Introduction (McGraw-Hill 2022)
	Electronic Sources (Links must be added)	researchgate.net/publication
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Mohamed Abozeid	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

Course Code: H 204

Course Name: Quality Assurance & Control

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught		Level 2	
Term/ Academic year	Feb.		2025/2026		Credit Hours:		2	
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	-	Total	2
Pre-Requisite								
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Mohamed Abo zeid					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

3. This course covers quality assurance vs quality control, importance of QA and QC, quality in manufacturing, quality control procedure, requirements, how to improve quality control procedures, creating an effective QA inspection checklist, pros and cons of internal vs external QA practices, streamlining inspection processes, quality assurance and quality control tool.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1 Know Essential facts, concepts, principles, and theories relating to computing and information and computer applications.
- a.2 List tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.
- a.3 Discuss QA & QC management with testing in Software Development Life Cycle.



- a.4 Summarize the extent to which a computer-based system meets the criteria defined for its current use and future development.
- a.5 Describe the principles of generating tests that investigate the functionality of computer programs and evaluate their results.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1 Analyze computing problems and provide solutions related to the design and construction of computing systems.
- b.2 Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.
- b.3 Evaluate the results of tests to investigate the functionality of computer systems.
- b.4 Identify criteria to measure and interpret the appropriateness of a computer system.
- b.5 Identify main ideas, and errors in a computer system.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1 Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.
- c.2 Apply computing information retrieval skills in computing community environment and industry.
- c.3 Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy.
- c.4 Apply computing information retrieval skills in computing community environment and industry.
- c.5 Assess the implications, risks or safety aspects involved in the Ways of life

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.
- d2. Demonstrate skills in group working, team management, time management and organizational skills.
- d3. Show the use of information retrieval.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a2
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development.	a4
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a5
A11	Requirements, practical constraints, and computer-based systems.	a2
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.	b4
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b5
B6	Evaluate the results of tests to investigate the functionality of computer systems.	b3
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b2,b3
C1	Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.	c1
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c2
C4	Apply computing information retrieval skills in computing community environment and industry.	c2
C13	Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy.	c3
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d2
D3	Show the use of information-retrieval.	d3



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5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	QA&QC (definition, focus on, goals, how to achieve)	2	2			a1, b1, c1
Week-2	QA & QC examples, responsibility	2	2			a2, b1, c2
Week-3	Importance of QA & QC & Quality & conformance	2	2			a2, b2, c3
Week-4	Quality- product & process aspect	2	2			a3, b3, c1
Week5	Integrate customer satisfaction & conformance to specification	2	2			a2, b2, c2
Week-6	QA & QC plan	2	2			a4, b3, c3
Week-7	Revision	2	2			a2, b4, c1, d1
Week-8	Midterm Exam.					
Week-9	The Concept of Software Quality and Difference between QA, QC and testing	2	2			a3, b4, c4, d1
Week-10	The Process of Software Testing in Practice	2	2			a4, b3, c4, d2
Week-11	The Levels of Testing	2	2			a5, b3, c4, d1
Week-12	The Methods of Software Testing	2	2			a5, b4, c4, d2
Week-13	The Types of Software Testing	2	2			a5, b5, c4, d3
Week-14	The Future of Testing	2	2			a3, b5, c5, d3



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√	√	√	√	√	√	√	√	√				

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	6	10	10%
2	Quiz 2 written (Semester work)	-	-	-
3	Midterm exam	8	20	20 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	-	0	-
6	Final Oral Exam	-	0	-
7	Assignments / Project	10	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



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8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Quality Assurance in Higher Education: Challenges and Innovations" (2023) by David L. McMillan.
	Other References	"Principles of Quality Assurance in Education: A Global Perspective" (2023) by Mohammed A. G. Atwell
	Electronic Sources (Links must be added)	https://www.researchgate.net/publication/331345390_Quality_Assurance_in_Higher_Education_A_Practical_Handbook
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Mohamed Abozeid	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 103

Course Name: Object-Oriented Programming

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught		Level Two	
Term/ Academic year	Oct.		2025/2026		Credit Hours:		3	
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 102							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Sarah Ahmed Soliman					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course uses an object-oriented language with procedural capabilities (such as C++ or Java) to teach object-oriented concepts, design and programming topics including classes, inheritance, encapsulation, polymorphism, information hiding, patterns, and CRC cards. Typical programming language topics might include templates, exception handling, virtual functions, and parameterized data types.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Define the fundamentals about Object-Oriented Programming.
- a.2. Outline the scientific developments in the OOP Environment.
- a.3. Outline the principles of inheritance and polymorphism to simplify problems.



b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Analyze computing problems when not using OOP and provide solutions related to the design and construction of computing systems.
- b.2. Recommend ideas and designs using OOP for presentation of computing systems.
- b.3. Evaluate the results of tests to investigate the functionality of OOP based computer systems.
- b.4. Clarify classifications of OOP methods and techniques.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1 Design technical presentations suitable for the time, place, and audience.
- c.2 Use web resources to implement problems creatively using OOP.
- c.3 Use the scientific literature to implement an efficient algorithm based on OOP.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Formulate hard tasks to develop communication skills.
- d.2. Schedule the tasks with multiple deadlines.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a2
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a3
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b2
B6	Evaluate the results of tests to investigate the functionality of computer systems.	b3
B12	Perform classifications of (data, results, methods, techniques, algorithms. etc.).	b4
C6	Design, implement, maintain, and manage software systems.	c1



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C8	Handle a mass of diverse data, assess risk and draw conclusions.	c2
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c3
D3	Show the use of information-retrieval.	d1
D7	Show the use of general computing facilities.	d2

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	- Primitive data types and data types as objects. - Data Abstraction and encapsulation	4	2	-	2	a1,a2,c2,d1,d2
Week-2	- Functions (call by value and call by reference). - Overloading, default arguments. - Storage class specifier.	4	2	-	2	a1,a2,c2,d1,d2
Week-3	- Classes Constructor / Destructor - Inline functions. - Class member access.	4	2	-	2	a2,a3,b1,c2,d2,d3
Week-4	- Array of objects. - Object references	4	2	-	2	a3,b1,b2,c2,c3,d2,d4
Week5	Classes: Friend function. Overloading constructor functions.	4	2	-	2	a3,a4,b1,c2,c3,d2,d4
Week-6	- Assigning objects. - Passing objects to functions.	4	2	-	2	a2,a3,b1,c2,d2,d3
Week-7	- Copy constructor. - This keyword.					
Week-8	Midterm Exam.					
Week-9	- Operator overloading: - Member functions.	4	2	-	2	b1,c2,c3
Week-10	- Friend functions. - Binary operators - Unary operators	4	2	-	2	a4,b1,c2,c3,d2,d4
Week-11	Inheritance: Overview about inheritance.	4	2	-	2	a4,b1,c2,c3,d2,d4



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	- Protection for base class. - Discuss an example for inheritance.					
Week-12	Inheritance: - Inheriting multiple base class. - Constructors and destructors. - Discuss an example to illustrate multiple classes	4	2	-	2	a3,b1,b2,c2,c3,d2,d4
Week-13	Polymorphism: - Pointers to derived types. - Virtual function. - Virtual base class. - Abstract classes.	4	2	-	2	a3,a4,b1,c2,c3,d2,d4
Week-14	Lab Exam					

6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓			✓	✓								



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7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5 %
2	Quiz 2 written (Semester work)	11	5	5 %
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10 %
6	Final Oral Exam	0	0	0
7	Assignments / Project	weekly	10	10 %
8	Field training	0	0	0
9	Other (Mention)	0	0	0

8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Python Object-Oriented Programming: Build Robust and Maintainable Object Oriented Python Applications and Libraries, 4th Edition, 2021
	Other References	None
	Electronic Sources (Links must be added)	https://www.tutorialspoint.com/python/python_classes_objects.htm
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Sarah Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



**Higher Technological Institute (HTI)-10th of Ramadan City
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Course Specification

Course Code: CS 201

Course Name: Data Structure

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 2		
Term/ Academic year	Oct.	2025/2026			Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 103							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Sarah Ahmed Soliman 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course investigates abstract data types (ADTs), including lists, stacks, queues, priority queues, trees, and graphs. The emphasis is on the trade-offs associated with implementing alternative data structures for these ADTs. There will be four or five substantial programming assignments.



3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Define concepts and principles of different abstract data types.
- a.2. Describe the different implementations of data structures and algorithms for appropriate design decisions based on application data requirements.
- a.3. Define different Algorithms & complexity.
- a.4. know which data structure or algorithm is best for a given situation.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Evaluate algorithms and data structures in terms of time and memory complexity of basic operations.
- b.2. Analyze different real problems and solve them using ADT.
- b.3. Distinguish an efficient algorithm based on ADT.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Combine fundamental data structures and algorithmic techniques in building a complete algorithmic solution to a given problem.
- c.2. Build a Mini-project using OOP coding for different data structures and algorithms applications.
- c.3. Use appropriate programming languages to representing stacks.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Communication and teamwork practice.
- d.2. Demonstrate the use of information-retrieval.
- d.3. Reveal the use of general computing facilities.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1, a2
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a1, a3
A10	Current developments in computing and information research.	a3
A11	Requirements, practical constraints, and computer-based systems.	a4
B4	Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints.	b1, b2, b3
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b3
B12	Perform classifications of (data, results, methods, techniques, algorithms. etc.).	b3
C3	Deploy the equipment and tools used for the construction, maintenance, and documentation of computer applications.	c2
C8	Handle a mass of diverse data, assess risk and draw conclusions.	c1, c2
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c3
D3	Show the use of information-retrieval.	d2
D5	Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.	d1, d2
D7	Show the use of general computing facilities.	d3



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5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			ILOs Covered by Course
			Lec.	Tut.	Lab.	
<i>Week -1</i>	Introduction to Programming, Data Structure and Algorithm, Brief Revision to C++ and OOP.	4	2	0	2	a.1
<i>Week-2</i>	Stack Basic principles, Operation of stack, Implementation Stack using Array, Applications of stack	4	2	0	2	a.1, a.2
<i>Week-3</i>	Queue Basic principles, Operation of queue, Implementation Queue using Array, Applications of queue	4	2	0	2	a.1, a.2, b.1
<i>Week-4,5</i>	linked list, Array versus linked list, Linked lists operations in C++, Types of linked lists, Stack and queue implementation using linked list	8	4	0	4	a.1, a.2, b.1, b.2
<i>Week-6</i>	Tree data structure and its components. binary tree, Binary Search Tree Operations.	4	2	0	2	a.2, a.3, b.1, b.2
<i>Week-7</i>	Binary Search Tree Traversals BFS, DFS	4	2	0	2	a.2, a.3, b.1, b.2
<i>Week-8</i>	Midterm Exam					
<i>Week-9</i>	AVL Tree Operations	4	2	0	2	a.2, a.3, b.1, b.2
<i>Week-10</i>	Sorting Algorithms (Selection, Insertion, Bubble), Algorithm Analysis , Big O Notation.	4	2	0	2	a.3, a.4, b.3, c.1
<i>Week-11</i>	Sorting Algorithms(Merge, Quick , Heap)	4	2	0	2	a.3, a.4, b.3, c.1
<i>Week-12,13</i>	Graph representations, Graph Traversals Algorithms :Depth-first search and Breadth-first search.	8	4	0	4	a.3, a.4, b.3, c.1
<i>Week-14</i>	LAB EXAM					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√		√	√	√								



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7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5th week	5	5%
2	Quiz 2 written (Semester work)	10th week	5	5%
3	Midterm exam	8th week	10	10 %
4	Final Written Exam	15th, 16th week	60	60 %
5	Final Practical Exam	14th week	10	10%
6	Final Oral Exam	0	0	0
7	Assignments / Project	6th, 12th week	10	10%
8	Field training	0	0	0
9	Other (Mention)	0	0	0



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Armstrong Subero, "CODELESS DATA STRUCTURES AND ALGORITHMS", ISBN-13 (electronic): 978-1-4842-5725-8, 2020. S.Mohanty and P.Tripathy, "Data Structure and Algorithms Using C++, A Practical Implementation", Scrivener Publishing, John Wiley & Sons, 2021.
	Other References	• Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Fourth Edition, Florida International University, ISBN-13: 978-0-13-284737-7, Pearson Education, 2014. • Introduction to Algorithms: A Creative Approach • Data Structures and Algorithms in Java • Problem-Solving with Algorithms and Data Structures using Python.
	Electronic Sources	• https://www.cs.usfca.edu/~galles/visualization/Algorithms.html
Supportive facilities & equipment for teaching and learning *	(Links must be added)	
	Learning Platforms (Links must be added)	Microsoft Teams
	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)



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Computer Science Department

Course Specification

	Course Coordinator	Program Coordinator
Name	Dr. Sarah Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



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Computer Science Department

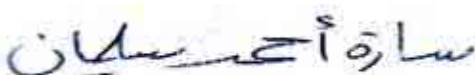
Course Specification

Course Code: CS 203

Course Name: File processing

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught		Level 2	
Term/ Academic year	Oct.		2025/2026		Credit Hours:		3	
Contact Hours	Lecture:	2	Tutorial:		Lab.:	2	Total	4
Pre-Requisite	CS 102							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Sara Ahmed Soliman 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course gives an overview of files: file design, file manipulation, blocking and buffering (both single & double buffering). Types of storage devices (magnetic tapes, magnetic disks) are presented. Space and time calculation, Sequential file, relative file, indexed sequential file, multiple key files, and direct access file. External sort / merge algorithms. File systems-disk scheduling.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Define the fundamental concepts, principles, theories, and mathematical results relevant to computer science.
- a.2. Recognize internal file structures and formats.



- a.3. Describe differences between various record and field representations.
- a.4. Describe file organization issues and possible means for addressing them.
- a.5. Recognize different secondary storage devices.
- a.6. Recognize issues affecting access speed on secondary storage.
- a.7. Name modern keyed access methods, indexes & hashing.
- a.8. Recognize the difference between storing data in memory & secondary storage.
- a.9. Define the different techniques to store and access data stored in secondary storage devices.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Realize different secondary storage devices.
- b2. Identify the different techniques used to organize data in secondary storage devices.
- b3. Evaluate the time needed to access data stored in secondary storage devices.
- b4. Evaluate the amount of space needed to store data in secondary storage devices.
- b5. Identify file organization techniques.
- b6. Realize the best way data in a file given the data characteristics
- b7. Create an appreciative design for a given problem.
- b8. Realize proposed solutions given to the problem at hand.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Calculate storage requirements and access times.
- c2. Use sequential as well as direct file access to retrieve disk data.
- c3. Apply file organization methods to improve file access efficiency.
- c4. Build primary and secondary indices for a given file.
- c5. Apply indexes and hashing techniques to improve retrieval of data.
- c6. Develop a new file system that reduces the access time as much as possible.
- c7. Prepare and construct documentation of technical reports with verbal and written structure.
- c8. Design technical presentations suitable for the time, place, and audience.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Retrieve information from a variety of sources such as libraries, printed or electronic sources.
- d2. Formulate an approach to the deployment the communication skills.
- d3. Schedule personal responsibility by working to multiple deadlines in complex activities and categorize any risks or safety aspects related to these activities.
- d4. Work as a member of a team to solve a specific problem.



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d5. Design a technical presentation based on reading references.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1,a2,a3
A6	The current and underlying technologies that support computer processing and inter-computer communication.	a2
A18	The fundamental topics in Computer Science, including hardware and software architectures, software engineering principles and methodologies, operating systems, compilers, parallel and distributed computing, systems, and software tools.	a1,a2,a3
A19	Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing.	a1
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1,b2,b3
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b2,b3
B17	Identify a range of solutions and critically evaluate and justify proposed design solutions.	b2,b3
C4	Apply computing information retrieval skills in computing community environment and industry.	c2,c3
C14	Specify, design, and implement computer-based systems.	c1,c2,c3
C15	Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.	c1,c2,c3
C16	Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.	c2,c3
D3	Show the use of information-retrieval.	d1
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	D2,d3



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5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			ILOs Covered by Course
			Lec.	Tut.	Lab.	
<i>Week -1</i>	Introduction to the design and specification of file structures	4	2	-	2	a1,a2,a3
<i>Week-2</i>	Fundamental file processing operations	4	2	-	2	a1,a2,b1, b2
<i>Week-3</i>	Secondary storage and system software	4	2	-	2	a1,a2,b1, b3,c1,c2
<i>Week-4</i>	Tree structured file organization	4	2	-	2	a2,b3, c1,c2,d1, d2
<i>Week5</i>	List structured file organization	4	2	-	2	a1,a2, b1,b3, c1,c2,d1, d2
<i>Week-6</i>	High balanced binary search tree	4	2	-	2	a3,c3,d3
<i>Week-7</i>	Managing files of records	4	2	-	2	a3,b1,c1,c2,d1
<i>Week-8</i>	Midterm Exam					
<i>Week-9</i>	Organizing files for performance	4	2	-	2	a1,a2,a3, b1,c1,c2,d1,d2
<i>Week-10</i>	Consequential processing and sorting of large files	4	2	-	2	a1,a2, a3, b1,b3,c1,c3,d1,d3
<i>Week-11</i>	Consequential processing and sorting of large files	4	2	-	2	a1,a3,b2,c3,d2
<i>Week-12</i>	Indexing, indexed sequential file organization	4	2	-	2	a1,a3,b1,c1,c2,c3,d1,d3
<i>Week-13</i>	Hashing, Perfect hashing, dynamic hashing	4	2	-	2	a1,a2, b1,b3, c1,c2,d1, d2
<i>Week-14</i>	Lab Exam					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓			✓	✓	✓		✓					

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	9	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	-
7	Assignments / Project	weekly	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	File Structures, An object-oriented approach with C++ by Folk, Zoellick, Riccardi.
	Other References	None
	Electronic Sources (Links must be added)	None
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Sara Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

Course Code: CS 204

Course Name: Introduction to Database

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	LEVEL 2		
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 104							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Shaimaa Abdallah Ibraheem					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course includes database models and systems: introduction to data abstraction E-R models, Hierarchical, network, relational, and object-relational; query languages and processing; database Applications development; views; security; concurrency; recovery. The process of relational database Design starting from conceptual database design, through logical database design up to and including Physical database design, database tuning and administration normalization theory.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Define concepts, principles of database and database management system.
- a.2. Describe the fundamentals of relational, object-oriented, and distributed database systems including data models, database architectures, and database manipulations.
- a.3. List the major system components.
- a.4. Define the theories and techniques in developing database applications and be able to demonstrate the ability to build databases using enterprise DBMS products such as Oracle or SQL Server



b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Express the different issues involved in the design and implementation of a database system.
- b.2. Explain the tools used for the creation of database.
- b.3. Explain essential DBMS concepts such as database security, integrity, concurrency, distributed database, and intelligent database, Client/Server Database Server), Data Warehousing.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Implement comprehensive computing knowledge and skills to build simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.
- c.2. Use the tools of querying languages, primarily SQL, and another database supporting software to apply information retrieval.
- c.3. Apply security and integrity policies relating to databases.
- c.4. Apply the principles of the physical and logical database designs, database modeling, relational, hierarchical, and network models to handle a mass of data.
- c.5. Use appropriate programming languages, web-based systems and tools to design database systems.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Show the use of information retrieval in database system.
- d.2. Demonstrate appropriate numeracy skills in understanding and presenting cases Involving a quantitative dimension of database.



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4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a2
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a3
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results	a4
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.	b1
B4	Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints.	b2
B10	Define traditional and nontraditional problems, set goals towards solving them, and. observes results.	b3
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c1
C4	Apply computing information retrieval skills in computing community environment and industry.	c2
C6	Design, implement, maintain, and manage software systems.	c3
C8	Handle a mass of diverse data, assess risk and draw conclusions.	c4
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c5
D3	Show the use of information-retrieval.	d1
D5	Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.	d2



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5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Overview of Database Concepts	4	2		2	a1, a2
<i>Week-2</i>	Database & Database Users part1	4	2		2	a1, a2
<i>Week-3</i>	Database & Database Users part2	4	2		2	a1, a2, a3
<i>Week-4</i>	Database Concepts & architecture	4	2		2	a3, b1, c2, d1
<i>Week-5</i>	Relational data Model and Constraints	4	2		2	a3, a4, b1, b2, c1, c2, d1
Week-6	Enhanced Entity-Relationship (EER) Modeling	4	2		2	a4, b1, b2, b3, c2, c3, d1, d2
Week-7	Revision					
Week-8	Midterm Exam.					
<i>Week-9</i>	Basic SQL	4	2		2	a4, b2, b3, c1, c2, d1, d2
<i>Week-10</i>	View definition, DML operations & view, logical data independence	4	2		2	b2, b3, c3, c4, d1, d2
<i>Week-11</i>	The Relational Data Model and Relational Database Constraints	4	2		2	a4, b2, b3, c3, c4, c5, d1, d2
<i>Week-12</i>	Relational Database Design by ER- and EERR-to-Relational Mapping	4	2		2	b2, b3, c2, c3, c4, d1, d2
<i>Week-13</i>	Normalization	4	2		2	b3, c3, c4, c5, d1, d2
Week-14	LAB AND ORAL EXAM					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓			

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	10	10	10 %
2	Quiz 2 written (Semester work)	-	0	-
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10 %
6	Final Oral Exam	-	0	-
7	Assignments / Project	weekly	10	10 %
8	Field training	-	0	-
9	Other (Mention)	-	0	-



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Course Specification

8- learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Mark Gillenson, "Fundamentals of Database Management Systems" 3rd edition 2021.
	Other References	Ramez Elmasri and Shamkant B. Navathe, "Fundamentals of Database Systems", Addison Wesley, 7th edition 2017. Connolly & Begg "Database Systems, A practical approach to design, implementation, and management", Addison Wesley. 2017
	Electronic Sources (Links must be added)	• https://www.w3schools.com/sql/ • https://www.coursera.org/ • http://www.odbms.org/
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Shaimaa Abdallah Ibraheem	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 301

Course Name: Assembly Language

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught		Level 2	
Term/ Academic year	Oct.		2025/2026		Credit Hours:		3	
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 102							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Sarah Ahmed Soliman 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2- Course Overview:

In this course, the student will learn to use the Assembly programming language to create applications, explore the basics like setting up a project, the structure of an Assembly code and advanced topics like function recursion and system calls. Investigate the various registers that the Assembly language uses to store data and commands for manipulating stored data, also will learn about jumps, functions, loops, macros and stacks, architecture of processors, memory system organization and architecture.

3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Recognize and classify computer-based programs (Assembly)



- a.2. Know the extent to which a computer-based programs (Assembly) meets the criteria defined for its current use and future development.
- a.3. Recognize the current and underlying technologies that support computer languages such as assembly.
- a.4. Know the principals of generating tests which investigate the functionality of Assembly and evaluating their results.
- a.5. know the current developments in computing and its relation to low level languages such as Assembly.
- a.6. Recognize the requirements, practical constraints low level languages such as Assembly.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1.Explains the criteria to measure and interpret the appropriateness of a low level language for its current deployment.
- b.2. Analyze, propose and evaluate low level languages such as Assembly.
- b.3.Analyze the judgments considering assembly codes.
- b.4.Evaluate assembly in a range of knowledge areas.
- b.5.Compare attributes, components, relationships, patterns, main ideas, and errors.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1.Apply programs in assembly language to handle the keyboard and screen, perform arithmetic, convert between ASCII and binary formats, perform table searches and sorts, and handle disk input and output.
- c.2.Develop a range of fundamental programming skills, using online resources, technical repositories and library-based material.
- c.3. Test the implications, involved in the operation of low level computing languages.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Show the ability to deal with group members.
- d.2. Show the need to continue studying low level languages such as assembly.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a2,a6
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development.	a2
A6	The current and underlying technologies that support computer processing and inter-computer communication.	a3
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a4
A10	Current developments in computing and information research.	a4,a5
A11	Requirements, practical constraints, and computer-based systems.	a6
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.	b1,b5
B4	Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints.	b2
B7	Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact.	b3
B9	Evaluate research papers in a range of knowledge areas.	b4,b5
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b5
C1	Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.	c1,c3
C5	Develop a range of fundamental research skills, using online resources, technical repositories and library-based material.	c2



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C7	Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.	c3
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d1
D8	Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.	d2



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5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Review on 8086 microprocessor Architecture and memory management	4	2	0	2	a 1-a2-a6
Week-2	Assembly language fundamentals	4	2	0	2	a 3-a4-d2
Week-3	Instruction formats & using Debugger	4	2	0	2	a5- b1
Week-4	Addressing modes	4	2	0	2	a 6- b2 – b3
Week5	Arithmetic Instructions	4	2	0	2	c1 – c2
Week-6	Call and Control instructions	4	2	0	2	a11- b3- b5
Week-7	Revision	4	2	0	2	d1- b3 -b4
Week-8	Midterm Exam.					
Week-9	Translating Conditional Constructions	4	2	0	2	c1-c2-c3
Week-10	Procedure management	4	2	0	2	b2- b4- b5
Week-11	Stack management	4	2	0	2	c1
Week-12	Interrupts and I/O	4	2	0	2	c2
Week-13	Input and Output organizations	4	2	0	2	c3
Week-14	LAB EXAM					



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6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√			√	√			√		√			√

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5 th week	5	5%
2	Quiz 2 written (Semester work)	10 th week	5	5%
3	Midterm exam	8 th week	10	10 %
4	Final Written Exam	15 th , 16 th	60	60 %
5	Final Practical Exam	14 th week	10	10%
6	Final Oral Exam	0	0	0
7	Assignments / Project	6 th ,12 th	10	10%
8	Field training	0	0	0
9	Other (Mention)	0	0	0



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Course Specification

8- Learning Resources and Supportive Facilities :

Learning resources (books, scientific references, etc.) *	The main (essential) reference	William Stallings - Computer Organization and Architecture, Global Edition-Pearson (2021)
	Other References	- KIP R. IRVINE, "Assembly Language for x86 Processors", Seventh Edition 2015. - BARRY B. BREY, "THE INTEL MICROPROCESSORS Architecture, Programming, and Interfacing", Eighth Edition 2009. - M. Morris Mano, "Computer Architecture" Third edition ©2001
	Electronic Sources (Links must be added)	None
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Sarah Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

Course Code: CS 306

Course Name: Computer Architecture

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught		Level 2	
Term/ Academic year	Oct.		2025/2026		Credit Hours:		3	
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	BS 104							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Rania Ragab Hussien 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2- Course Overview:

This course gives a study of computer systems with an emphasis on contemporary designs. Pipelining, cache and memory design, input/output, how the various computer components process the data, and how the operating system and the hardware cooperate to make computer operation possible, hardwired versus microprogramming control organization, I/O devices & interrupt handling, interfacing and communication.



3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Explain the fundamental concepts of computer architecture, including the components of a computer system, their functions, and how they interact to execute instructions.
- a.2. Explain the concepts of pipelining and memory hierarchy in computer architecture.
- a.3. Define the trade-offs between different architectural choices (e.g., instruction set architecture, memory hierarchy) in terms of their impact on system performance and cost.
- a.4. Understand the impact of practical constraints (e.g., manufacturing limitations, physical laws) on computer system design and performance.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Analyze the impact of different architectural choices (e.g., instruction set architecture, pipelining, cache memory) on computer performance and energy efficiency. Analyze, propose and evaluate low level languages such as Assembly.
- b.2. Evaluate memory management techniques and their influence on overall system performance.
- b.3. Explain attributes, components, relationships, main ideas, and access errors for Memories (Technologies, attributes, and access types).
- b.4. Express the research papers in a range of knowledge areas regarding Computer Architecture.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Develop and test control mechanisms, interrupt handling routines, and I/O controllers.
- c.2. Implement and optimize pipelining in a given computer architecture scenario.
- c.3. Apply independent information acquisition, using scientific literature and Web sources for computer architecture.

General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Demonstrate the ability to make use of a range of learning resources and to manage one's own learning regarding computer architecture .
- d.2. Demonstrate skills in group working effectively, team management, time management and organizational skills.
- d.3. Create a report showing your results to demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a1,a2
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development.	a3,a4
A6	The current and underlying technologies that support computer processing and inter-computer communication.	a1
A11	Requirements, practical constraints, and computer-based systems.	a1,a4
B4	Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints.	b1
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b1,b3
B7	Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact.	b1
B9	Evaluate research papers in a range of knowledge areas.	b4
C5	Develop a range of fundamental research skills, using online resources, technical repositories and library-based material.	c1
C7	Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.	c3,c2
C11	Perform independent information acquisition and management, using scientific literature and Web sources.	c3
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1



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D2	Demonstrate skills in group working, team management, time management and organizational skills.	d2
D8	Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.	d3

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hrs</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Introduction to Computer Systems	4	2	-	2	a1, b1
Week-2	Performance Issues: • Designing for Performance • Ahmdahl's Law and Little' • Basic Measures (Benchmarks and Spec)	4	2	-	2	a1, a3, a4, b1
Week-3	A Top- Level View of Computer Function and Interconnection	4	2	-	2	a1, a4, b3
Week-4	Instruction cycle	4	2	-	2	a3, b1, c3
Week5	Memory System	4	2	-	2	a2, a3, a4, b2,b3
Week-6	Cache Memory (Direct mapping)	4	2	-	2	a2, a3, a4, b2,b3
Week-7	Midterm Revision and reminder	4	2	-	2	a1, a2, a3, a4, b1, b2, b3
Week-8	Midterm Exam.					
Week-9	Cache Memory (cont.): • Associative Mapping	4	2	-	2	a2, a3, a4, b2,b3
Week-10	Instruction Sets: Characteristics and Functions	4	2	-	2	a3, b1, b4
Week-11	Instruction Sets	4	2	-	2	a3, b1, b4
Week-12	Addressing modes	4	2	-	2	a1, a3, b1
Week-13	Interrupts and Pipeline	4	2	-	2	a2, b1, c2
Week-14	LAB EXAM					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓			✓					



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7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5th week	5	5%
2	Quiz 2 written (Semester work)	10th week	5	5%
3	Midterm exam	8th week	10	10 %
4	Final Written Exam	15th, 16th week	60	60 %
5	Final Practical Exam	14th week	10	10%
6	Final Oral Exam	0	0	0
7	Assignments / Project	6th, 12th week	10	10%
8	Field training	0	0	0
9	Other (Mention)	0	0	0



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8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	William Stallings - Computer Organization and Architecture, tenth Edition Pearson(2021)
	Other References	Computer Organization and Design: The Hardware/ Software Interface, Fifth Edition 2022. Computer Architecture: A Quantitative Approach by John L. Hennessy and David A. Patterson, fifth edition 2012.
	Electronic Sources (Links must be added)	Edit code - EDA Playground Computer System Architecture Electrical Engineering and Computer Science MIT Open Course Ware
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

Course Code: FT 201

Course Name: Field Training

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory			Academic level at which the course is taught	LEVEL 2		
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:		0
Contact Hours	Lecture:	18	Tutorial:		Lab.:		Total 18
Pre-Requisite	30 credits completed.						
Academic standards			NARS 2010				
Bylaw Approval			2022				
Course Coordinator			Dr. Shaimaa Abdallah Ibraheem				
Course Specification Approval			Department Council				
Course Specification Approval Date			20/8/2025				

2. Course Overview:

Each Student must attend a supervised training program of 10 weeks in a relevant field to gain practical experience in a real engineering environment. At the end of the training period, the student must submit a written report for evaluation.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Describe the current and underlying technologies in the labor market that support computer processing and inter-computer communication.
- a.2. Recognize professional, moral and ethical issues involved in the computer technology labor market and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.
- a.3. List of the requirements, practical constraints and computer-based systems.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Analyze computing problems and provide solutions related to the design and construction of computing systems.



- b.2. Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.
- b.3. Identify attributes, components, relationships, patterns, main ideas, and errors.
- b.4. Summarize the proposed solutions of the training field and their results.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Implement comprehensive computing knowledge and skills in training field and in deployment of computers to solve position practical problems.
- c.2. Apply computing information retrieval skills in computing community environment and industry.
- c.3. Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.
- c.4. Prepare technical reports, and a dissertation, to a professional standard; use IT skills in the training field.
- c.5. Specify, design, and implement computer-based systems.
- c.6. Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.
- c.7. Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds and apply them in the training field.
- c.8. Apply the principles of human-computer interaction to the evaluation and construction of a wide range of materials including user interfaces, web pages, and multimedia systems.
- c.9. Apply and manage the need for continuing professional and practical development in recognition of the need for life long-learning

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Use IT skills and display mature computer literacy.
- d.2. Reveal communication skills, public speaking and presentation skills, and delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.
- d.3. Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.



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4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A6	The current and underlying technologies that support computer processing and inter-computer communication	a1,
A9	Professional, moral, and ethical issues involved in the exploitation of computer technology and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.	a2
A11	Requirements, practical constraints, and computer-based systems.	a3
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.	b2
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b3
B15	Restrict solution methodologies upon their results.	B4
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c1
C4	Apply computing information retrieval skills in computing community environment and industry.	c2
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c3
C13	Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy.	c4
C14	Specify, design, and implement computer-based systems.	c5
C15	Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.	C6
C16	Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.	C7
C17	Apply the principles of human-computer interaction to the evaluation and construction of a wide range of materials including user interfaces, web pages, and multimedia systems.	C8
C18	Apply and manage the need for continuing professional and practical development in recognition of the need for life long-learning.	C9



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D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d1
D6	Reveal communication skills, public speaking and presentation skills, and delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.	d2
D8	Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.	d3

5- content:

Training Fields:

- Networks (Administration, design, implementation, infrastructure)
- Networks and ICT.
- Developing (Desktop, Web, Mobile, embedded systems)
- AI (smart home, smart cities, IoT, modeling, medical field)
- Information Systems.
- Business Intelligence.
- Database and Data warehouse (design, administration)
- Data mining (market research, e-Business, other).
- General Applications.
- Graphical Systems and Applications
- Microprocessor Applications and Peripherals.
- Other Information technology related fields (required approval from supervisor).

Rules and Regulations:

- The student must perform Field Training for 120 hours in an industrial or service facility related to the student's program and must be under the full supervision of the department. It is also possible to perform the training inside the department in a similar environment.
- The training follow-up will be handled by the academic advisor assigned by the Program Steering Committee.
- Identifying a company official contact person.
- The student must submit a technical report to his/her academic advisor at the end of the training period.
- The company should submit a student's training evaluation form to the academic advisor at the end of the training period.
- Field Training is evaluated on Pass / Fail basis and does not count in the cumulative GPA calculation. Student should pass the Field Training to be graduated.



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Training Authority Report	Student Performance	-	-
2	Supervisor Report	Overall result	Pass / Fail	-
3	Training Authority Survey	For explanation	-	-
4	Student Survey	For explanation	-	-

8- learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	
	Other References	
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)



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	Course Coordinator	Program Coordinator
Name	Dr. Shaimaa Abdallah Ibraheem	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

Course Code: BS 103.

Course Name: Discrete Mathematics.

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught		Level 2	
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:		3	
Contact Hours	Lecture:	2	Tutorial:	2	Lab.:		Total	4
Pre-Requisite	BS 101							
Academic standards				NARS 2010				
Bylaw Approval				٢٠٢٢				
Course Coordinator				Dr. Mohamed Abozeid 				
Course Specification Approval				Department Council				
Course Specification Approval Date				٢٠/٨/٢٠٢٥				

2. Course Overview:

This course covers the mathematical topics most directly related to computer science. Topics included: logic, relations, functions, basic set theory, mathematical induction, countability and counting arguments, proof techniques, graph theory, recursion, recurrence relations, and number theory, Boolean algebra, with an emphasis on application in computer science.

3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Define the main items of the sets, relations between the sets, functions and the logic.
- a.2. List the main items of the basic concepts the mathematical induction.
- a.3. Define Recurrence Relations.
- a.4. Describe the main concepts of number theory and their applications.
- a.5. Explain the principles of graph theory and their applications.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Design the elements of mathematical modeling.



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b.2. Analyze the system of problem solving.

b.3. Prove Creative thinking.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

c.1. Demonstrate skills regarding thinking mathematically.

c.2. Apply the Propositional logic in computer science, artificial intelligence, and mathematics.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

d.1. Working in a team group.

d.2. Can perform and explain the gained knowledge orally.

d.3. Solving problems related to computer science.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1, a2
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a1, a3
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a3
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a4
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development.	a5
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1, b2, b3
C1	Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.	c1
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c2
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d2



5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Sets.	4	2	2	0	a1,b,d1
Week-2	Relations between the sets and Functions.	4	2	2	0	a1,b1,c1,d1
Week-3	Logic. Boolean algebra.	4	2	2	0	a1,b1,c1,d2
Week-4	Exercise on sets, relations, functions, and logic.	4	2	2	0	a1,b1,c1,d1,d2
Week5	Mathematical Induction.	4	2	2	0	a2,b1,b2,b3,c1,d2
Week-6	Recursion Solving Recurrence Relations.	4	2	2	0	a2,a3,b2,b3,c2,d1
Week-7	Revision	4	2	2	0	a1,a2,a3,b1,b2,b3,c1,c2,d1,d2
Week-8	Midterm Exam.					
Week-9	The Integers and Division. Integer Representations, Primes.	4	2	2	0	a4,b1,b2,c1,c2,d1
Week-10	Greatest Common Divisors. Solving Congruences. Least Common Multiple. Applications of Number Theory.	4	2	2	0	a4,b1,b2,c1,c2,d1,d2,d3
Week-11	Graphs and Graph Models. Graph Terminology and Special Types of Graphs.	4	2	2	0	a5,b1,c2,d1
Week-12	Representing Graphs. Graph Isomorphism. Connectivity.	4	2	2	0	a5,b1,c2,d2
Week-13	Shortest-Path Problems.	4	2	2	0	a5,b3,c2,d2
Week-14	Revision.	4	2	2	0	a4,a5,b1,b2,b3,c1,c2,d1,d2,d3



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓				✓	✓								

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	11	5	5%
3	Midterm exam	8	20	20 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	—	—	—
6	Final Oral Exam	—	0	0
7	Assignments / Project	Every Week	10	10%
8	Field training	—	0	0
9	Other (Mention)	—	0	0



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	"Discrete Mathematics: A Problem Solving Approach" by László Lovász (2021).
	Other References	• C. Stein, R. L. Drysdale, K. Bogart, Discrete Mathematics for Computer Science Students, 2011. • Kenneth H. Rosen, Discrete Mathematics and Its Applications, 7th Edition, 2007.
	Electronic Sources (Links must be added)	: WWW.WOLFRAM.COM
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Mohamed Abozeid	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 202

Course Name: System Analysis and design

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught		LEVEL 2	
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:		3	
Contact Hours	Lecture:	2	Tutorial:		Lab.:	2	Total	4
Pre-Requisite	CS 104							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Shaimaa Abdallah Ibraheem					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course focuses on system analysis and design, system development life cycle, system planning, structured analysis, system design, design strategies, Input / Output & forms design, testing and quality Assurance, Implementation & Maintenance, System Security and Audit, Object-Oriented Approach.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Define system analysis concepts.
- a.2. Describe the tools and methodologies of information gathering techniques information strategy planning (ISP), and classes of information



- a.3. Describe current developing in system analysis and design.
- a.4. Discuss using diagrams in information system developing.
- a.5. Describe information system developing lifecycle.
- a.6. Discuss types of information systems architectures and analyzing each business case.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Explain business processes problems and provide solutions using system analysis techniques.
- b.2. Set ideas, proposals and designs using modeling.
- b.3. Explain traditional and nontraditional information systems problems, use system analysis and design to set goals towards solving them, and. observes results.
- b.4. Explain comparisons between different types of modeling.
- b.5. Recommend the suitable tools, methods, and techniques for modeling, analyzing IS, establishing criteria, and verify solutions.
- b.6. Identify a range of solutions and justify proposed design solutions.
- b.7. Identify problem analysis from written descriptions; derive requirements specifications from an understanding of problems (analysis, synthesis).

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Develop a range of fundamental research skills, using online resources in designing information system.
- c.2. Use appropriate programming languages, web-based systems and tools, design methodologies, and database systems in designing an information system.
- c.3. Produce acceptable reports and user system documentation from a developed IS.
- c.4. Perform information acquisition and management through a designed IS.
- c.5. Apply the principles of human-computer interaction to the evaluation and construction of a wide range of materials including user interfaces and web pages.
- c.6. Maintaining existing information systems

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Demonstrating skills in group working, team management, time management and organizational skills when working in analysis and designing an IS.
- d.2. Show the use of information-retrieval when analysis and designing an IS.
- d.3. Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a2
A10	Current developments in computing and information research.	a3
A11	Requirements, practical constraints, and computer-based systems.	A4
A13	Using of high-level programming languages.	A5
A18	The fundamental topics in Computer Science, including hardware and software architectures, software engineering principles and methodologies, operating systems, compilers, parallel and distributed computing, systems, and software tools.	A6
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b2
B10	Define traditional and nontraditional problems, set goals towards solving them, and. observes results.	b3
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b4
B14	Summarize the proposed solutions and their results.	b5
B15	Restrict solution methodologies upon their results.	b6
B17	Identify a range of solutions and critically evaluate and justify proposed design solutions.	B7
C6	Design, implement, maintain, and manage software systems.	c1
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c2
C13	Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy.	c3



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C14	Specify, design, and implement computer-based systems.	c4
C16	Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.	c5
C18	Apply and manage the need for continuing professional and practical development in recognition of the need for life long-learning.	c6
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d1
D3	Show the use of information-retrieval.	d2
D7	Show the use of general computing facilities.	d3



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5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Introduction to Systems Analysis	4	2	-	2	a1, b1
Week-2	Information System Development	4	2	-	2	a1, b1
Week-3	Project selection and management	4	2	-	2	a1, b2
Week4	Requirements Determination	4	2	-	2	a1, b2
Week-5	Use case analysis	4	2	-	2	a1, b2
Week-6	Process modeling	4	2	-	2	a3
Week-7	Moving into design	4	2	-	2	a3
Week-8	Midterm Exam.					
Week-9	Architecture design	4	2	-	2	b5,b7,c1,c2
Week-10	User interface design	4	2	-	2	b.3,c3
Week-11	User interface design (cont.)	4	2	-	2	b3 ,c3,c4,
Week-12	Program design	4	2	-	2	b3 ,c5,d1
Week-13	Moving into implementation	4	2	-	2	a5,b4,c6,d1,d2,d3
Week-14	LAB AND ORAL EXAM					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓			

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	10	10	10 %
2	Quiz 2 written (Semester work)		0	
3	Midterm exam	7	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10 %
6	Final Oral Exam		0	
7	Assignments / Project	weekly	10	10 %
8	Field training		0	
9	Other (Mention)			



8- learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	SYSTEMS ANALYSIS AND DESIGN' 7 th edition by Alan Dennis, Barbara Haley Wixom, and Roberta M. Roth. 2018
	Other References	Scott Tilley, "System analysis and design", 12 th edition, Cengage Learning, 2019.
	Electronic Sources (Links must be added)	System Design Journal: SDJ: http://systemdesign.altera.com/
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Shaimaa Abdallah Ibraheem	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 205

Course Name: Fundamentals of Multimedia

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 2		
Term/ Academic year	Choose an item.	2025/2026			Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 103							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Sarah Ahmed Soliman					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

The course will discuss types of multimedia information: text, speech, audio, images, graphics, video, animation and their characterization; multimedia processing, compression standards and techniques; multimedia systems, storage and I/O devices as well as content generation and manipulation tools; multimedia networking characteristics, requirements and protocols; multimedia applications in communication, database and entertainment.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1 Define the main components of multimedia.
- a.2 Identify the different types of digital image representations.
- a.3 Define the High-Level Programming Languages in multimedia systems (e.g., Python).



a.4 List the relevant techniques from various multimedia application areas such as Animation.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Categorize multimedia data according to relevant criteria, such as content type (educational, entertainment, marketing), format (JPEG, MP3, etc.), or purpose (illustration, narration, background music).
- b2. Analyze the classifications of (data, results, methods, techniques, algorithms. etc.)
- b3. Explain the strategy to solve computer science problems with pressing commercial or industrial constraints.
- b4. Evaluate the effectiveness of this solution under constraints, considering the cost and quality.
- b5. Simulate an innovative design to solve a problem containing a range of commercial and industrial constraints.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Use different color models.
- c2. Use appropriate programming languages for multimedia systems.
- c3. Design computer-based systems for multimedia projects.
- c4. Implement computer-based systems for multimedia projects.
- c5. Use various methods of multimedia data compression.
- c6. Use multimedia applications efficiently.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Manage how to present the multimedia data content desired.
- d2. Work to interpret multimedia data compression algorithms.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1, a2, a3, a4
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a3, a4
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1, b3, b4, b5
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1, b2
C1	Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.	c1, c2
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c2, c3, c4, c5, c6
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d2



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5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Introduction to multimedia	4	2	-	2	a1, a2
Week-2	- Components of a Multimedia System - Classification of Multimedia System - Explain different Media types - Multimedia data quality - Multimedia Applications	4	2	-	2	a1, a2, b1
Week-3	- Digital Data Acquisition - Analog to digital conversion - Sampling Theorem and Aliasing	4	2	-	2	a2, a3, b1, b2
Week-4	Raster Image	4	2	-	2	a3, b2, c1
Week5	Vector Image	4	2	-	2	a3, b2, c1, c2, d1
Week-6	Image Dithering	4	2	-	2	a3, b2, b3, c1, c2, c3, d1
Week-7	Revision	-	-	-	-	Revision
Week-8	Midterm Exam.					
Week-9	Image Transition and different image formats	4	2	-	2	a2, b3, c3, c4, d1
Week-10	- Physics of sound, sound cards - Digital Audio representation - Quantization - Characteristic of Sound - Different Audio Formats	4	2	-	2	a3, a4, c4, d1
Week-11	- 2D Graphic Representation - Animation	4	2	-	2	a3, a4, b3, c4, d1
Week-12	Video conversion, mixing, and displaying	4	2	-	2	a3, a4, b1, b4, b5, c5, d1
Week-13	Basic Compression Algorithms	4	2	-	2	c4, c5, c6, d1, d2
Week-14	LAB EXAM	4	2	-	2	a3, b3, b4, b5, c2, c3, c4, c5, c6, d1, d2



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓		✓		✓				

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	10	10 %
2	Quiz 2 written (Semester work)		0	
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10 %
6	Final Oral Exam		0	
7	Assignments / Project	12	10	10 %
8	Field training		0	
9	Other (Mention)		0	



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Fundamentals of Multimedia Ze-Nian Li, Mark S. Drew, Jiangchuan Liu Springer Nature, Feb 16, 2021
	Other References	Chow, K., Chan, V. & Ho, A. (2009). <i>Multimedia Rules: Rethinking Design Principles</i>. (1st ed.), School of Design, The Hong Kong Polytechnic University
	Electronic Sources (Links must be added)	https://www.aonlinetraining.com/
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Sarah Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

Course Code: CS 303

Course Name: Logic Programming

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught		Level 3	
Term/ Academic year	Oct.		2025/2026		Credit Hours:		3	
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 102							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Mona Mohamed Fouad					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course deals with the logic programming paradigm and Prolog. It discusses the syntax and the semantics of Prolog, the working of a Prolog interpreter, and various applications of Prolog. In particular, the course considers using Prolog for Database Querying, Parsing and Problem Solving in Artificial Intelligence, etc. Meta-Programming aspects of Prolog will be emphasized.



3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1 Explain the fundamental concepts of logic programming and the Prolog programming language, including its syntax, semantics, and inference mechanisms.
- a.2 Describe the architecture and working principles of a Prolog interpreter, including its control strategy, backtracking mechanism, and rule-based reasoning.
- a.3 Understand the concepts of unification, recursion, and backtracking in Prolog, and their applications in solving problems.
- a4. Identify and Apply Prolog programming techniques for database querying, parsing, natural language processing, and problem-solving in artificial intelligence.
- a5. Comprehend the meta-programming concept in Prolog and its applications in developing domain-specific languages, program analyzers, and code transformations.
- a6. Appreciate the role of Prolog in the broader context of declarative programming paradigms and its contributions to the field of computer science.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Analyze and formulate problems in a declarative manner suitable for logic programming and Prolog.
- b2. Design and implement Prolog programs to solve complex problems, utilizing techniques such as recursive predicates, list processing, and backtracking.
- b3. Deconstruct and interpret Prolog programs, tracing their execution.
- b4. Integrate Prolog programs with other programming languages or systems, leveraging its strengths in areas such as knowledge representation and reasoning.
- b5. Critically analyze and discuss the theoretical foundations of logic programming, including the resolution principle, unification, and the relationship between logic programming and mathematical logic.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1 Design programs using prolog language.
- c.2 Apply logic programs to solve problems by formulating them as queries.
- c.3 Examine the correctness and completeness of logic programs, ensuring they produce accurate and comprehensive results

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Work collaboratively with others to solve complex problems.



- d2. Communicate effectively with team members to achieve common goals.
d3. Adapt quickly to new concepts, technologies, and tools.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1,a2,a3
A2	Modeling and design of computer-based systems bearing in mind the trade-offs	a4,a5
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a5,a6
A13	Using of high-level programming languages	a5,a6
A16	The principles and techniques of several application areas informed by the research directions of the subject, such as artificial intelligence, natural language processing, data mining, databases, and computer graphics	a6
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems	b1
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b2,b3
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b2,b4,b5
B13	Identify attributes, components, relationships, patterns, main ideas, and errors	b1,b3,b5
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c2
C3	Deploy the equipment and tools used for the construction, maintenance, and	c3



	documentation of computer applications	
C5	Develop a range of fundamental research skills, using online resources, technical repositories and library-based material	c2,c3
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c1,c2
C14	Specify, design, and implement computer-based systems.	c1,c2,c3
D2	Demonstrate skills in group working, team management, time management and organizational skills	d1,d2
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d1,d2
D6	Reveal communication skills, public speaking and presentation skills, and delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.	d1,d2
D7	Show the use of general computing facilities.	d1,d2,d3

5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	An overview of Prolog: Facts, Relations, Objects, Rules.	4	2	0	2	a1, a2,a3, a4
Week-2	An overview of Prolog: Facts, Relations, Objects, Rules.	4	2	0	2	a1, a2,a3, a4
Week-3	Syntax and meaning of Prolog programs	4	2	0	2	a1, a2, a4,b1,c1
Week-4	Structures and trees	4	2	0	2	a4,a5,b2,c1,c2,c3,d1, d2,d3
Week5	Structures and trees	4	2	0	2	a4,a5,b2,b3,c1,c2,c3, d1,d2,d3



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Week-6	Backtracking and depth-first search	4	2	0	2	a4,a5,b2,b3,c1,c2,c3, d1,d2,d3
Week-7	Arithmetic and comparison operators	4	2	0	2	a4,a5,b2,b3,c1,c2,c3, d1,d2,d3
Week-8	Midterm Exam.					
Week-9	Recursive search and mapping	4	2	0	2	a4,a5,b2,b3,c1,c2,c3, d1,d2,d3
Week-10	Recursive comparison, joining structures	4	2	0	2	a4,a5,b2,b3,c1,c2,c3, d1,d2,d3
Week-11	Accumulators and different structures	4	2	0	2	a5,b2,b3,c1,c2,c3,d1, d2,d3
Week-12	Controlling backtracking	4	2	0	2	a5,b2,b3,c1,c2,c3,d1, d2,d3
Week-13	Prolog Applications	4	2	0	2	a4,a5,a6,b1,b2,b3,c1, c2,c3,d1,d2,d3
Week-14	Practical Exam					

6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓								



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7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	10	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	0	0	0%
7	Assignments / Project	6,12	10	10%
8	Field training	0	0	0%
9	Other (Mention)	0	0	0%



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Course Specification

8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Introduction to logic programming, Ronald J. Brachman, Francesca Rossi, and Peter Stone, Series Editors, 2020. Knowledge Representation in Logic: A Prolog Perspective" by J. McCarthy and others (2020).
	Other References	None
	Electronic Sources (Links must be added)	https://www.tutorialspoint.com/execute_prolog_online.php https://swish.swi-prolog.org .
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Mona Mohamed Fouad	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 305

Course Name: Software Engineering

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught		Level 3	
Term/ Academic year	Oct.		2025/2026		Credit Hours:		3	
Contact Hours	Lecture:	2	Tutorial:		Lab.:	2	Total	4
Pre-Requisite	CS 202							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr/Sarah Ahmed Soliman					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course aims to understand and apply a wide range of principles and tools available to the software engineer, such as design methodologies, choice of algorithm, language, software libraries and user interface technique. It also introduces the basics of the software life cycle, from requirements definition to development and evaluation.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Describe Criteria and specifications appropriate to Software life cycle
- a.2. Describe the extent to which the essentials of requirements phase meet the criteria defined for its current use and future development.
- a.3. Define the Principals of generating Various types of software modeling.



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- a.4. Illustrate the design of a complete test plan.
- a.5. List the requirements, practical constraints and computer-based systems.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Explain criteria to measure and interpret the appropriateness of a software system for its current deployment and future evolution.
- b.2. Summarize with the different design methodologies.
- b.3. Express traditional and nontraditional problems, set goals towards solving them, and, observes results.
- b.4. Explain different software testing techniques.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Apply the equipment and tools used for the construction, maintenance and documentation of software applications.
- c.2. Apply Design, implement, maintain, and manage software systems.
- c.3. Prepare and present seminars to a professional standard.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Demonstrate efficiently produce significant requirements document.
- d.2. Demonstrate design software using various methodologies
- d.3. Show implementation and validation of the software development modules.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a1, a4
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development.	a2, a5
A7	Principals of generating tests which investigate the functionality of computer programs and systems and evaluating their results.	a3, a4
A10	Current developments in computing and information research.	a5
A11	Requirements, practical constraints, and computer-based systems.	a5
B8	Familiar with the professional, legal, moral, and ethical issues relevant to the computing industry.	b4



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B10	Define traditional and nontraditional problems, set goals towards solving them, and observe results.	b3
B11	Perform comparisons between algorithms, methods, techniques, etc.	b1
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b2
C3	Deploy the equipment and tools used for the construction, maintenance, and documentation of software applications.	c1
C6	Design, implement, maintain, and manage software systems.	c2
C7	Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.	c2
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d2
D7	Show the use of general computing facilities.	d3
D8	Demonstrate an appreciation of the need to continue professional development in recognition of life-long learning.	d1

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			ILOs Covered by Course
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
<i>Week -1</i>	Introduction to Software Engineering	4	2	-	2	a1,b1
<i>Week-2</i>	Software Process	4	2	-	2	a1,a2,b1,b2
<i>Week-3</i>	Agile Software Development	4	2	-	2	a4,b3
<i>Week-4</i>	Requirement Engineering	4	2	-	2	a2,a5,b3,c1,c2,d1
<i>Week5</i>	Requirement Engineering(cont's)	4	2	-	2	a2,a5,b3,c1,c2,d1
<i>Week-6</i>	System modelling	4	2	-	2	a3,b1,c1,c2,d1
<i>Week-7</i>	Revision	4	2	-	2	
<i>Week-8</i>	Mid-term					
<i>Week-9</i>	Architecture Design	4	2	-	2	b1,b2,c2,d2
<i>Week-10</i>	Software Design	4	2	-	2	b1,b2,c2,d2
<i>Week-11</i>	Software Implementation	4	2	-	2	c1,c2,c3,d1,d2
<i>Week-12</i>	Software testing	4	2	-	2	a4,a5,d3
<i>Week-13</i>	Software testing(cont's)	4	2	-	2	A4,a5,d3
<i>Week-14</i>	LAB AND ORAL EXAM					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓		✓	✓	✓	✓	✓	✓					✓		✓	

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	6	5	5%
2	Quiz 2 written (Semester work)	10	5	5%
3	Midterm exam	7	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam			
7	Assignments / Project	Through the semester	10	10%
8	Field training			
9	Other (Mention)			



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Engineering Software Products: An Introduction to Modern Software Engineering, by Ian Sommerville, 2020.
	Other References	
	Electronic Sources (Links must be added)	-IEEE Xplore, Software Engineering Journal: http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=2225. -Software Engineering Periodicals: http://www.rsps.com/spi/periodicals.html.
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr/Sarah Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 307

Course Name: Theory and Design of Compilers

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory			Academic level at which the course is taught	Level 3		
Term/ Academic year	Oct.	2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:		Lab.:	2	Total: 4
Pre-Requisite	CS 306						
Academic standards			NARS 2010				
Bylaw Approval			2022				
Course Coordinator			Dr/Sarah Ahmed Soliman				
Course Specification Approval			Department Council				
Course Specification Approval Date			20/8/2025				

2. Course Overview:

This course aims to acquire the student the practical skills to write a simple compiler for an imperative programming language. It allows the student to understand the concepts of scanning, parsing, name management in nested scopes, and code generation. Also, it aims to transfer the skills to general software engineering tasks (e.g., parsing of structured data files or argument lists).

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1 Define concepts, principles and theories relating to compilers.
- a.2 Describe the methodologies used in the specification and design of compilers.



a.3 Describe the extent to which a compiler meets the criteria defined for its current use and future development.

a.4 Summarize the principles of generating tests which investigate the functionality of compilers and evaluating their results.

a.5 Select advanced topics to provide a deeper understanding of compilers.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

b1. Analyze compilers problems and provide solutions related to the design and construction of compilers.

b2. Evaluate the results of tests to investigate the functionality of compilers.

b3. Perform comparisons between lexical analysis and syntax analysis.

b4. Perform classifications of compilers.

b5. Summarize Run-Time environments and their results.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

c1. Operate compilers, recognizing its logical and physical properties, capabilities and limitations.

c2. Implement comprehensive compilers knowledge and skills in projects and in deployment of compilers to solve practical problems.

c3. Implement Semantic analysis.

c4. Use appropriate programming languages to operate the compilers.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

d1. Show the use of information-retrieval in compilers.

d2. Use IT skills and display mature computer literacy.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1,a2
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a3
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development.	a3,a4,a5
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a2,a4
A19	Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing.	a4,a5
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1
B6	Evaluate the results of tests to investigate the functionality of computer systems.	b2
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b3
B12	Perform classifications of (data, results, methods, techniques, algorithms. etc.).	b4
B14	Summarize the proposed solutions and their results.	b5
C1	Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.	c1
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c2
C6	Design, implement, maintain, and manage software systems.	c3
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c4
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d2
D7	Show the use of general computing facilities.	d1



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5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Introduction to Compiling	3	2	-	2	a1,c1,c4
Week-2	One Pass Compiler	3	2		2	a1,a3,b1,c1,c4
Week-3	Lexical Analysis part 1	3	2		2	a2,b3,b4,d1
Week-4	Lexical Analysis part 2	3	2		2	a2,b3,b4,d1
Week5	Syntax Analysis part 1	3	2		2	a2,b3,b4,d1
Week-6	Syntax Analysis part 2	3	2		2	a2,b3,b4,d1
Week-7	Syntax-Directed Translation	3	2		2	a2,b3,b4,d1,a5
Week-8	Midterm Exam.					
Week-9	Semantic Analysis.	3	2		2	a3,b1,c2,c3,c4
Week-10	Intermediate-Code Generation part 1	3	2		2	a3,a4,b2,c2,c4
Week-11	Intermediate-Code Generation part 2	3	2		2	a3,a4,b2,c2,c4
Week-12	Run-Time Environments	3	2		2	b5,c4,d2
Week-13	Code Generation	3	2		2	c2,c4,d1,d2
Week-14	LAB AND ORAL EXAM	3	2		2	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓			✓	✓					✓			

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5 TH	5	5%
2	Quiz 2 written (Semester work)	9 TH	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14 TH	10	10 %
6	Final Oral Exam	-	0	-
7	Assignments / Project	10 TH	10	10 %
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Keith D. Cooper, Linda Torczon, " Engineering a Compiler ", 1st Edition, Morgan Kaufmann, 2021.
	Other References	
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr/Sarah Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



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Course Specification

Course Code: CS 309

Course Name: Mobile App Development

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 4		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:		Lab.:	2	Total	4
Pre-Requisite	CS 302							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator								
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course introduces the principles of mobile application design and development. Students will learn application development on the Android platform. Topics will include memory management; user interface design; user interface building; input methods; data handling; network techniques and URL loading; and, finally, specifics such as GPS and motion sensing. Students are expected to work on a project that produces a professional-quality mobile application. Projects will be deployed in real world applications. Course work will include project conception, design, implementation, and pilot testing of mobile phone software applications, using weight loss and physical activity motivation health applications as the target domain.



3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a1. Understand the principles of mobile application design and development on the Android platform.
- a2. Explain memory management and user interface design/building in mobile applications.
- a3. Describe input methods, data handling, and network techniques including URL loading.
- a4. Understand GPS and motion sensing technologies in mobile applications.
- a5. Recognize the process of designing, implementing, and testing health-related mobile applications, such as those for weight loss and physical activity motivation.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Analyze user requirements to create effective and user-centered mobile applications.
- b2. Evaluate memory management strategies for optimizing mobile app performance on the Android platform.
- b3. Critically assess user interface designs and apply appropriate techniques for building responsive and intuitive interfaces.
- b4. Apply data handling methods and network techniques to ensure reliable communication and efficient data processing within mobile apps.
- b5. Develop solutions to integrate GPS and motion sensing technologies for context-aware mobile applications.
- b6. Solve complex design and implementation problems using best practices in mobile development.
- b7. Synthesize the entire development process, from project conception to real-world deployment, ensuring the creation of professional-quality health-focused mobile.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Design and develop professional-quality Android mobile applications, ensuring compliance with industry standards.
- c2. Implement efficient memory management, data handling, and user interfaces to optimize app performance and user experience.
- c3. Integrate advanced features such as GPS, motion sensing, and networking into mobile applications for practical, real-world use.
- c4. Deploy, test, and refine mobile applications, focusing on health-related projects like weight loss and physical activity motivation apps.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Communicate and collaborate effectively within teams to develop and implement mobile applications, particularly in health-related projects.
- d2. Manage time, resources, and adapt to new technologies, ensuring successful project completion and continuous improvement.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a2
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a3
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a4
A10	Current developments in computing and information research.	a5
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1,b2
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1,b2
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b3,b4
B6	Evaluate the results of tests to investigate the functionality of computer systems.	b5
B7	Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact	b6
B8	Familiar with the professional, legal, moral, and ethical issues relevant to the computing industry.	b7
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b3,b7
C3	Deploy the equipment and tools used for the construction, maintenance, and documentation of computer applications.	c4
C6	Design, implement, maintain, and manage software systems.	c1
C7	Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.	c3
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c2
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d2
D7	Show the use of general computing facilities.	d1



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Course Specification

5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Mobile application Introduction (Android)	3	2	-	2	a1,a2
Week-2	Android Development Tools	3	2		2	a1,a2
Week-3	Android First Application	3	2		2	a1, a2,b2, b3,c2, d1
Week-4	Android Structure of the Application	3	2		2	a1,a2, b2, b3,c2,c3, d1
Week5	Android UI Part 1: TextView, ImageView, ScrollView	3	2		2	a1,a2,a3 b1, b3,c1,c2, d1,d2
Week-6	Android Activity	3	2		2	a1,a4,a5,b2,b3,b4,b 5,c1,c2
Week-7	Android UI Part 2: MediaPlayer, Button, Start a new Activity	3	2		2	a1, ,b1,b2,b3,c1,c2,d1
Week-8	Midterm Exam.					
Week-9	Debugging Android App Android UI Part 2:MediaPlayer, Button, Starta new Activity	3	2		2	A1,a2, b1,b2,B3, b4,b5,c1,c2,c3 d1,d2
Week-10	Android UI Part 3:EditText, RadioGroup,RadioButton	3	2		2	a1, a2,b1, b2,b3, c1, c2,c3, d1
Week-11	Android UI Part 4:EditText, TextView,ButtonForm Validation Android UI Part 5:ListView	3	2		2	a1, a2,a3,a4,a5,b1, b2,b6 c1, c3,c4
Week-12	Android UI Part 6: Action Bar. Android UI Part 7: Web View. &Android Database SQLite	3	2		2	a1,a2, a3,a4,a5,b1,b3,b5, c1, c2, c3, c4,d1, d2
Week-13	Putting It All Together, Student presentations and reports of team research projects.	3	2		2	a1, a2, a3,a4,a5 b1, b2, b3,b4,b5,b6,b7 c1, c2, c3,c4,d1,d2
Week-14	LAB AND ORAL EXAM	3	2		2	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓			✓	✓					✓			

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5 TH	5	5%
2	Quiz 2 written (Semester work)	9 TH	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14 TH	10	10 %
6	Final Oral Exam	-	0	-
7	Assignments / Project	10 TH	10	10 %
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Android Programming with Kotlin for Beginners" by John Horton (2023)
	Other References	-Android Studio 3, Apress, 2018, Mark Wickham, Practical Android - Teg Hagos, Learn Android Studio 3, Apress, 2018, ISBN: 978-1484231555 - Mark Wickham, Practical Android: 14 Complete Projects on AdvancedTechniques and Approached, Apress, 2018, ISBN: 978-1484233320 - Neil Smyth, Android Studio 3.0 Development Essentials – Android 8 - Edition, CreateSpace Independent Publishing Platform, 2017, ISBN: 978-1977540096 - 4B. Phillips and B. Hardy, Android Programming: The Big Nerd Ranch Guide, Big Nerd Ranch Guides, 2013.
	Electronic Sources (Links must be added)	- Google, Android Developer Resources, https://developer.android.com/index.html - Google Android Studio: https://developer.android.com/studio/
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name		Dr. Rania Ragab Hussien
Signature		



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

Course Code: CS 321

Course Name: Simulation and Modeling

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 3		
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 103							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Rania Ragab Hussien 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course introduces the concepts and terminology of the modeling and simulation field to students. It provides both analytical and simulative tools that serve as a basis for addressing several performance analyses and engineering problems in computer networks and communication systems. This course also familiarizes the student with the types of software used and exposes them to simulation software through projects. Also, it discusses distributed simulation techniques and simulation protocols.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Define and explain key concepts and terminology in modeling and simulation, including types of models, simulation methodologies, and performance metrics.



- a.2. Describe distributed simulation techniques to model complex network systems involving multiple interconnected simulations.
- a.3. Describe the role and importance of modeling and simulation in analyzing and solving performance issues in computer networks and communication systems.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Analyze project results, draw conclusions, and present findings effectively, including documenting the simulation process, data analysis, and recommendations.
- b.2. Address synchronization and communication issues in distributed simulations and understand their impact on simulation accuracy and performance.
- b.3. Explain various simulation protocols used in distributed and network simulations, such as Time Warp, GVT (Global Virtual Time), and protocol-specific simulations.
- b.4. Discuss the importance and applications of modeling and simulation in computer networks and communication systems.
- b.5. Explain the significance and applications of modeling and simulation in analyzing and solving performance issues in computer networks and communication systems.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Use analytical methods to assess and solve performance issues in computer networks, such as queuing theory, network flow analysis, and throughput calculations.
- c.2. Interpret performance metrics to evaluate the efficiency and effectiveness of network systems and protocols.
- c.3. Apply simulation techniques to model network behaviors and communication protocols using simulation software tools.
- c.4. Develop and execute simulation experiments to analyze network performance and validate theoretical models.
- c.5. Plan, develop, and execute simulation projects that address specific performance analysis and engineering problems in computer networks and communication systems.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Demonstrate proficiency in using commonly employed simulation software tools relevant to computer networks and communication systems (e.g., NS-3, OMNeT++).
- d2. Create and configure simulation scenarios, including setting up network topologies, defining parameters, and running simulations.
- d3. Implement and evaluate the effectiveness of different simulation protocols in managing and coordinating simulation processes.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a1, a2, a3
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a1, a2, a3
A19	Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing.	a1, a2, a3
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b1, b2, b3, b4, b5
B6	Evaluate the results of tests to investigate the functionality of computer systems.	b1, b2, b3, b4, b5
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b1, b2, b3, b4, b5
B15	Restrict solution methodologies upon their results.	b1, b2, b3, b4, b5
B18	Solve computer science problems with pressing commercial or industrial constraints.	b1, b2, b3, b4, b5
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c1, c2,c3, c4,c5
C3	Deploy the equipment and tools used for the construction, maintenance, and documentation of computer applications.	c1, c2,c3, c4,c5
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c1, c2,c3, c4,c5
C10	Communicate effectively by oral, written, and visual means.	c1, c2,c3, c4,c5



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C17	Apply the principles of human-computer interaction to the evaluation and construction of a wide range of materials including user interfaces, web pages, and multimedia systems.	c1, c2,c3, c4,c5
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d1, d2, d3
D5	Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.	d1, d2, d3
D7	Show the use of general computing facilities.	d1, d2, d3

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Introduction to Modeling and Simulation	4	2	0	2	a1, a3
Week-2	Analytical Tools for Performance Analysis	4	2	0	2	a1, a2, a3, b1
Week-3	Introduction to Simulation Software	4	2	0	2	a1, a2, a3, b2, b3, b4
Week-4	2D and 3D Network Modeling	4	2	0	2	a1, a2, a3, b2, b3, b4
Week5	Simulation Methodologies	4	2	0	2	b4, b5, c1, c2, c3, c4, c5
Week-6	Simulation Software Projects	4	2	0	2	b4, b5, c1, c2, c3, c4, c5
Week-7	Distributed Simulation Techniques	4	2	0	2	b4, b5, c1, c2, c3, c4, c5
Week-8	Midterm Exam.					
Week-9	Simulation Protocols	4	2	0	2	b4, b5, c1, c2, c3, c4, c5
Week-10	Advanced Simulation Topics	4	2	0	2	b4, b5, c1, c2, c3, c4, c5
Week-11	Project Work and Case Studies	4	2	0	2	c1, c2, c3, c4, c5, d1, d2, d3
Week-12	Project Presentations	4	2	0	2	c1, c2, c3, c4, c5, d1, d2, d3
Week-13	Course Review and Future Directions	4	2	0	2	
Week-14	Course Review and Future Directions	4	2	0	2	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓		✓	✓		✓			

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	6	5	5%
2	Quiz 2 written (Semester work)	13	5	5%
3	Midterm exam	7	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	-
7	Assignments / Project	weekly	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	• "Modeling and Simulation of Computer Networks and Systems: Methodologies and Applications" by Mohammad S. Obaidat and Sabah S. Mohammed • "Introduction to Simulation Using SIMAN" by Jeffrey S. Owen
	Other References	• "Simulation Modeling and Analysis" by Averill M. Law and W. David Kelton • "Discrete-Event System Simulation" by Jerry Banks, John Carson, Barry Nelson, and David Nicol • "Network Simulation Experiments Manual" by Emad A. Shihab and Jean M. T. Campbell
	Electronic Sources (Links must be added)	• "Introduction to Network Simulation with NS-3" (Online Course) - o URL: Network Simulation with NS-3 coursera.org/learn/network-simulation • "Modeling and Simulation in Engineering and Computer Science" (MOOC)
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

Course Code: CS 322

Course Name: Computer Arabization

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 3		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:		Lab.:	2	Total	4
Pre-Requisite	CS 304							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator								
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2- Course Overview:

This course discusses issues and techniques that arise in computer Arabization. Topics include Arabic coding systems, Arabic display (visual output), Arabic speech synthesis (audio output), Arabic optical character recognition (visual input), and Arabic speech recognition (audio input).

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a1. Recognize the historical and modern Arabic coding systems used in digital text processing, including legacy systems like ASMO 708 and modern standards such as Unicode.
- a2. Understand the principles behind encoding Arabic script, including the handling of Unicode characters, combining marks, and bidirectional text.
- a3. Comprehend the challenges involved in displaying Arabic text accurately, including issues related to text rendering, bidirectionality, and contextual character shaping.



- a4. Learn about different text rendering engines and their approaches to Arabic script, such as font design, ligature handling, and layout algorithms.
- a5. Understand the fundamentals of Arabic speech synthesis, including the components of text-to-speech (TTS) systems, such as phonetic transcription, prosody generation, and voice synthesis.
- a6. Recognize the linguistic and phonetic characteristics of Arabic that impact speech synthesis, including dialectal variations and intonation patterns.
- a7. Know the techniques used in Arabic OCR systems, including image preprocessing, text segmentation, feature extraction, and recognition algorithms specific to Arabic script.
- a8. Understand the challenges in Arabic OCR, such as dealing with varying fonts, script styles, and the cursive nature of the Arabic script.
- a9. Learn about the principles of Arabic speech recognition, including acoustic modeling, language modeling, and the processing of phonetic and linguistic features.
- a10. Recognize the issues associated with Arabic speech recognition, such as handling different dialects, accents, and noisy environments.
- a11. Understand how to integrate various Arabization technologies into cohesive systems, and recognize the practical considerations for real-world applications.
- a12. Learn about the current trends and future directions in the field of Arabic language processing, including emerging technologies and their potential impacts.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Analyze the strengths and limitations of different Arabic coding systems and their impact on text processing and digital communication.
 - b2. Evaluate the appropriateness of various coding systems for different applications, considering factors such as compatibility, efficiency, and accuracy.
 - b3. Diagnose issues related to the visual display of Arabic text, such as incorrect rendering or bidirectional alignment and propose effective solutions.
 - b4. Synthesize knowledge of text rendering technologies to design and implement systems that handle complex Arabic display requirements.
 - b5. Critically evaluate the performance of Arabic speech synthesis systems in terms of naturalness, intelligibility, and linguistic accuracy.
 - b6. Design improvements or new approaches for Arabic speech synthesis, incorporating knowledge of phonetics, prosody, and dialectal variations.
 - b7. Assess the effectiveness of different OCR techniques for recognizing Arabic script, including handling issues related to font variations, text distortion, and script cursivity.
 - b8. Develop strategies for enhancing OCR accuracy and performance in Arabic text recognition, based on analysis of current technologies and methodologies.
 - b9. Analyze the performance of Arabic speech recognition systems, identifying strengths, weaknesses, and areas for improvement, especially in relation to dialects and noisy environments.
 - b10. Formulate solutions to enhance the robustness and accuracy of Arabic speech recognition systems, leveraging an understanding of acoustic and language modeling techniques.
 - b11. Integrate knowledge from various Arabization domains to address complex problems
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involving both visual and audio Arabic data processing.

b12. Develop comprehensive solutions for real-world applications that involve Arabic text and speech processing, considering user needs, technical constraints, and emerging trends.

b13. Conduct research to identify and explore innovative approaches and emerging technologies in the field of computer Arabization.

b14. Apply research findings to propose novel solutions or improvements, contributing to the advancement of Arabization technologies.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

c1. Implement various Arabic coding systems in software applications, ensuring proper encoding and decoding of Arabic text.

c2. Troubleshoot issues related to Arabic text encoding and interoperability between different coding systems and platforms.

c3. Utilize text rendering tools and libraries to correctly display Arabic script, addressing bidirectional text and contextual character shaping in different digital environments.

c4. Design and develop user interfaces that effectively handle Arabic text, incorporating best practices for visual presentation and user experience.

c5. Develop and configure Arabic speech synthesis systems, selecting appropriate synthesis methods and tuning parameters to achieve natural and intelligible audio output.

c6. Evaluate the quality of Arabic speech synthesis systems by testing and refining voice output based on user feedback and performance metrics.

c7. Implement OCR systems capable of recognizing Arabic script from scanned documents or images, optimizing preprocessing and recognition algorithms for accuracy.

c8. Develop custom solutions to handle specific challenges in Arabic OCR, such as varied fonts, text distortion, and cursive script variations.

c9. Build and train Arabic speech recognition models, incorporating acoustic and language models to handle various dialects and speech variations.

c10. Test and fine-tune speech recognition systems to improve accuracy and robustness in real-world applications, addressing issues like background noise and speaker variability.

c11. Integrate different Arabization technologies (e.g., OCR, speech synthesis, speech recognition) into cohesive applications or systems that address both visual and audio Arabic processing needs.

c12. Deploy and maintain Arabization solutions in real-world environments, ensuring they meet user requirements and perform effectively across different platforms and devices.

c13. Manage projects involving Arabization technologies, including planning, execution, and delivery, while adhering to timelines and resource constraints.

c14. Communicate technical concepts and solutions effectively to stakeholders, including non-specialists, through reports, presentations, and demonstrations.



c15. Apply ethical considerations and cultural sensitivity in the development and deployment of Arabization technologies, ensuring respect for linguistic diversity and regional variations.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. working with various Arabic coding systems (like Unicode), as well as technologies for Arabic speech synthesis and recognition. Proficiency in programming languages and tools used for these tasks are crucial.
- d2. Ensuring accurate Arabic text display and processing requires meticulous attention to detail, as even small errors can lead to significant issues in readability and functionality.
- d3. Explaining technical concepts and issues clearly to both technical and non-technical stakeholders.
- d4. Staying updated with the latest developments in Arabic language technology and coding standards.
- d5. Managing projects that involve Arabization, which might include coordinating with team members, setting timelines, and ensuring that all aspects of the project are completed effectively.
- d6. Understanding the cultural context and nuances of the Arabic language can help in creating more accurate and user-friendly applications.
- d7. Designing interfaces and systems that are intuitive and user-friendly for Arabic speakers, which involves understanding how Arabic text and speech are used in real-world applications.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a2
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a3
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a4
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development.	a5
A12	Essential mathematics relevant to computer science.	a6
A13	Using of high-level programming languages.	a7



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A14	Demonstrating basic knowledge and understanding of a core of analysis, algebra, applied mathematics and statistics.	a8
A15	Interpreting and analyzing data qualitatively and/or quantitatively.	a9
A16	The principles and techniques of several application areas informed by the research directions of the subject, such as artificial intelligence, natural language processing, data mining, databases, and computer graphics.	a9,a10
A17	Showing a critical understanding of the principles of artificial intelligence, image, and pattern recognition.	a11,a12
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b2
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.	b3
B4	Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints.	b4
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b5
B8	Familiar with the professional, legal, moral, and ethical issues relevant to the computing industry.	b6
B9	Evaluate research papers in a range of knowledge areas	b7
B10	Define traditional and nontraditional problems, set goals towards solving them, and. observes results.	b8
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b9
B14	Summarize the proposed solutions and their results.	b10
B15	Restrict solution methodologies upon their results.	b11
B16	Establish criteria and verify solutions.	b12
B18	Solve computer science problems with pressing commercial or industrial constraints.	b13
B19	Solve computer science problems with pressing commercial or industrial constraints.	b14
C1	Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.	c1,c2
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c5,c8
C3	Deploy the equipment and tools used for the construction, maintenance, and documentation of computer applications.	c12
C4	Apply computing information retrieval skills in computing community environment and industry.	c8



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Course Specification

C6	Design, implement, maintain, and manage software systems.	c4
C7	Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.	c6
C8	Handle a mass of diverse data, assess risk and draw conclusions.	c1,c2
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c1,c2
C10	Communicate effectively by oral, written, and visual means.	c14
C11	Perform independent information acquisition and management, using scientific literature and Web sources.	c13,c15
C12	Prepare and present seminars to a professional standard.	c14
C13	Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy.	c14,c15
C17	Apply the principles of human-computer interaction to the evaluation and construction of a wide range of materials including user interfaces, web pages, and multimedia systems.	c15
C18	Apply and manage the need for continuing professional and practical development in recognition of the need for life long-learning.	c13
D2	Demonstrate skills in group working, team management, time management and organizational skills.	
D3	Show the use of information-retrieval.	d1,d5
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d2
D5	Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.	d5
D6	Reveal communication skills, public speaking and presentation skills, and delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.	d1,d5
D7	Show the use of general computing facilities.	d2,d5
D8	Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.	d6,d7



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5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs.</i>			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Introduction to Computer Arabization	4	2	0	2	a's
Week-2	Arabic Coding Systems	4	2	0	2	a's, b's
Week-3	Arabic Display (Visual Output)	4	2	0	2	a's, b's
Week-4	Arabic Speech Synthesis (Audio Output)	4	2	0	2	a's, b's
Week5	Arabic Speech Synthesis (Audio Output)	4	2	0	2	a's, b's
Week-6	Arabic Optical Character Recognition (OCR)	4	2	0	2	a's, b's, c's
Week-7	Arabic Optical Character Recognition (OCR)	4	2	0	2	a's, b's, c's
Week-8	Midterm Exam.					
Week-9	Arabic Speech Recognition (Audio Input)	4	2	0	2	a's, b's, c's
Week-10	Arabic Speech Recognition (Audio Input)	4	2	0	2	a's, b's, c's
Week-11	Integration and Testing	4	2	0	2	a's, b's, c's, d's
Week-12	Integration and Testing	4	2	0	2	a's, b's, c's, d's
Week-13	Future Trends and Challenges	4	2	0	2	a's, b's, c's, d's
Week-14	Practical Projects and Hands-On Experience	4	2	0	2	a's, b's, c's, d's



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√			√	√					√			

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5 th	5	5%
2	Quiz 2 written (Semester work)	10 th	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14 th	10	10 %
6	Final Oral Exam		0	
7	Assignments / Project	9 th , 4 th	10	10 %
8	Field training		0	
9	Other (Mention)		0	



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	• "Arabic Computational Morphology: Knowledge-Based and Statistical Methods" Authors: Abdelhadi Soudi, Karl Schiller, and Ralf Steinberger • "Arabic Optical Character Recognition: A Survey" Authors: Rania Kora, Ayman El-Baz • "Text to Speech Synthesis: New Paradigms and Advances" Author: Paul Taylor • "Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition" Authors: Daniel Jurafsky and James H. Martin
	Other References	
	Electronic Sources (Links must be added)	• The Unicode Consortium's Website URL: unicode.org • Open Source Arabic OCR Tools Examples: Tesseract OCR with Arabic language support, Google Cloud Vision API • Arabic Speech Recognition Resources Examples: CMU Sphinx, Kaldi Speech Recognition Toolkit • Arabic Language Resources by LDC (Linguistic Data Consortium) URL: ldc.upenn.edu
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 323

Course Name: Natural Language Processing

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 3		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:		Lab.:	2	Total	4
Pre-Requisite	CS 103							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator								
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course gives an introduction to computational linguistics in general and natural language processing in particular. Reviewing background material in linguistics and surveying works on topics such as sublanguages, syntactic analysis, context, discourse analysis, application or world knowledge, machine translation, and text generation. Arabic computational linguistics.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1 Identify the fundamental concepts and theories related to NLP techniques
- a.2 Explain the principles and techniques to identify the criteria for current use and future development of different machine learning techniques used in NLP.
- a.3 Describe different qualitative and quantitative used in syntax, semantics, and other



components of natural language processing.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1.** Analyze different natural language problems and setting goals and requirements.
- b2.** Propose a set of alternative solutions for a given NLP problem associated with their results.
- b3.** Select appropriate methodologies and techniques for a given NLP problems solutions and setting out their limitations, restrictions and errors.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1.** Analyze, design, implement and test NLP systems.
- c2.** Apply, design methodologies, programming languages, database systems and different supporting tools for NLP systems

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1.** Work in a team to develop the requirement documentation
- d2.** Apply communication skills in presentations and report writing using various methods and tools.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1
A15	Interpreting and analyzing data qualitatively and/or quantitatively.	a3
A16	The principles and techniques of several application areas informed by the research directions of the subject, such as artificial intelligence, natural language processing, data mining, databases, and computer graphics.	a2
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1
B4	Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints.	b2
B17	Identify a range of solutions and critically evaluate and justify proposed design solutions.	b3
C6	Design, implement, maintain, and manage software systems.	c1
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c2
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d1
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d2



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5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Introduction To NLP.	3	2	-	2	a1,a2
Week-2	Regular Expressions.	3	2	-	2	a2,b1
Week-3	Text Preprocessing and Normalization.	3	2	-	2	a2,a3,b1
Week-4	Words , Transducers, Tokenization, Stop words, Stemming and Lemmatization,	3	2	-	2	a3,b2,b3,c1
Week5	N-gram Language Models.	3	2	-	2	a3,b2,b3, c2
Week-6	Vector Semantics and Embedding's. TF-IDF, Point wise Mutual Information, Word2vec, Semantic properties of embedding.	3	2	-	2	a3,b2,b3, c1,c2
Week-7	Neural Networks and Neural Language Models	3	2	-	2	a2,a3,b3,c2
Week-8	Midterm Exam					
Week-9	Sequence Labelling for Parts of Speech and Named Entities.	3	2	-	2	a2,a3,c1,c2, d1
Week-10	Knowledge Discovery, Text Mining.	3	2	-	2	b2,b3,c1,c2
Week-11	Sequence Labelling for Parts of Speech and Named Entities.	3	2	-	2	A3,b23,c1,c2,d32
Week-12	Transformers and Pretrained Language Models and Fine-Tuning and Masked Language Model.	3	2	-	2	a2,a3,b3,c2,d2
Week-13	NLP Applications. Machine Translation, Question Answering systems, etc.	3	2	-	2	b2,b3, c1,c2,d1,d2
Week-14	LAB AND ORAL EXAM					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√			√	√					√			

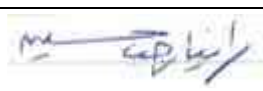
7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5 th	5	5%
2	Quiz 2 written (Semester work)	10 th	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14 th	10	10 %
6	Final Oral Exam		0	
7	Assignments / Project	9 th ,4 th	10	10 %
8	Field training		0	
9	Other (Mention)		0	



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	SPEECH and LANGUAGE PROCESSING: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition, written by Daniel Jurafsky and James H. Martin. Third Edition, McGraw Hill, 2023.
	Other References	none
	Electronic Sources (Links must be added)	The Algorithm Visualization Portal: The world's most trusted open ecosystem for sourcing, building, and deploying data science and AI initiatives: https://www.anaconda.com/ http://www.nltk.org/
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name		Dr. Rania Ragab Hussien
Signature		



Course Code: CS 324

Course Name: Open-Source System Development

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 3		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 103							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. RANIA RAGAB HUSSEIN					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course introduces concepts, principles and applications of open-source software. Discuss about open-source software development process. Cover economy, business, societal and intellectual property aspects of open-source software. Obtain hands-on experiences on open-source software and related tools through developing various open-source software applications such as mobile applications and Web applications.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Understand the fundamental concepts and principles of open-source software.
- a.2. Understand the economy and business models related to open-source software.
- a.3. Recognize societal and ethical implications of open-source software.



a.4. Understand intellectual property (IP) rights and open-source software licensing.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Critically evaluate the open-source software development process.
- b.2. Solve problems using open-source tools and software solutions.
- b.3. Analyze different open-source licenses and choose appropriate ones for software projects.
- b.4. Evaluate the economic and business advantages of adopting open-source software.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Design and develop software using open-source development frameworks and tools.
- c.2. Collaborate effectively in open-source software development communities.
- c.3. Apply knowledge of open-source licenses when developing software.
- c.4. Build mobile and web applications using open-source software

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Work effectively as part of a team in open-source development projects.
- d.2. Demonstrate critical thinking and decision-making when selecting open-source solutions.
- d.3. Adapt to the evolving landscape of open-source software tools and practices.
- d.4. Communicate technical information effectively to both technical and non-technical audiences.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a2
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a1,a3
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a4
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1,b2
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b3
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.	b1,b3
B4	Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints	b3,b4
C1	Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.	c1
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c2
C3	Deploy the equipment and tools used for the construction, maintenance, and documentation of computer applications.	c1,c3
C4	Apply computing information retrieval skills in computing community environment and industry.	c3,c4
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d2,d3
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d1
D3	Show the use of information-retrieval.	d3
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d4



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5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Introduction to Open-Source Software	4	2	0	2	a1,b1,c1,d1
Week-2	Principles of Open-Source Software Development	4	2	0	2	a2,b2,c2,d2
Week-3	Open-Source Licenses and Intellectual Property (IP)	4	2	0	2	a3,b3,c3,d3
Week-4	Open-Source Software Economy and Business Models	4	2	0	2	a4,b4,c4,d4
Week5	Societal Impact of Open-Source Software	4	2	0	2	a5,b5,c5,d4
Week-6	Hands-on Open-Source Development Tools	4	2	0	2	a6,b6,c6,d3
Week-7	Developing Open-Source Web Applications	4	2	0	2	a7,b7,d7,d2
Week-8	Midterm Exam.					
Week-9	Developing Open-Source Web Applications	4	2	0	2	a7, b7, c7, d7
Week-10	Developing Open-Source Mobile Applications	4	2	0	2	a8, b8, c8, d8
Week-11	Developing Open-Source Mobile Applications	4	2	0	2	a8, b8, c8, d8
Week-12	Contributing to Open-Source Projects	4	2	0	2	a9, b9, c9, d9
Week-13	Future Trends in Open-Source Software	4	2	0	2	a10, b10, c10, d10
Week-14	LAB examination	4	2	0	2	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓			✓					

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	5	5%
2	Quiz 2 written (Semester work)	10	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	-
7	Assignments / Project	All Weeks	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Lecturer Notes (PDF file, Presentation, and Word documents)
	Other References	"The Cathedral & the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary" Author: Eric S. Raymond • "Open Source Licensing: Software Freedom and Intellectual Property Law" Author: Lawrence Rosen "Producing Open Source Software: How to Run a Successful Free Software Project" Author: Karl Fogel "The Art of Community: Building the New Age of Participation" Author: Jono Bacon "Understanding Open Source and Free Software Licensing" Author: Andrew M. St. Laurent "The Success of Open Source" Author: Steven Weber
	Electronic Sources (Links must be added)	- GitHub Documentation URL: https://docs.github.com/ - Open Source Initiative (OSI) URL: https://opensource.org/ - GNU Operating System and the Free Software Foundation (FSF) - URL: https://www.gnu.org/ - Creative Commons URL: https://creativecommons.org/
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



**Higher Technological Institute (HTI)-10th of Ramadan City
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Course Specification

Course Code: CS 325

Course Name: Human Computer Interaction

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 3		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 308							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Rania Ragab Hussien 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This class presents a discussion of information processing characteristics important to human computer interaction and formal models of human-computer interaction. Topics include dialogue techniques, response times and display rates, information presentation, interaction devices, computer training, help systems, computer supported co-operative work, information search and visualization, hypermedia, and the World Wide Web.



3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a1. Demonstrate a comprehensive understanding of the core principles and theories in human-computer interaction, including information processing characteristics and user-centered design.
- a2. Understand the cognitive processes involved in information presentation and visualization and their impact on user experience and decision-making.
- a3. Acquire knowledge of various dialogue techniques, response time considerations, and display rates for optimal human-computer interaction design.
- a4. Understand the principles behind computer-supported cooperative work (CSCW), including group dynamics, communication tools, and collaboration software.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Critically evaluate formal models of human-computer interaction, including their effectiveness in real-world applications.
- b2. Apply HCI theories to solve practical problems related to interface design, taking into account user feedback, usability testing, and accessibility.
- b3. Assess the suitability of various interaction devices (e.g., keyboards, touchscreens, VR systems) for different user needs and tasks.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Design, implement, and evaluate user interfaces that optimize interaction through appropriatedialogue techniques, display rates, and response times
- c2. Design effective help systems and training tools that enhance user learning and support.
- c3. Develop interactive web-based systems and hypermedia applications that support seamless information search and retrieval.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Demonstrate the ability to work effectively in interdisciplinary teams, especially in the context of designing and evaluating cooperative work tools.
- d2. Present HCI concepts, designs, and research findings effectively, using appropriate visualization and communication techniques for diverse audiences.
- d3. Stay updated on emerging HCI technologies and trends, adapting designs and models to new interaction paradigms such as AR/VR, AI, and mobile interfaces.
- d4. Conduct independent research on HCI-related topics, using both qualitative and quantitative evaluation methods to assess interaction systems.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1,a2
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a3
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a2,a3
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a1,a4
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b2
B6	Evaluate the results of tests to investigate the functionality of computer systems.	b1,b3
B7	Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact	b3,b2
C8	Handle a mass of diverse data, assess risk and draw conclusions.	c1,c2
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c1,c3
C10	Communicate effectively by oral, written, and visual means.	c1,c2,c3
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d3
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d1,d2



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D3	Show the use of information-retrieval.	d3,d4
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d1,d2

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Dialogue Techniques	4	2	0	2	a1, a3, b2, c1, d2
Week-2	Response Times and Display Rates	4	2	0	2	a1, a3, b2, c1, d2
Week-3	Information Presentation	4	2	0	2	a2, b1, c1, d2
Week-4	Interaction Devices	4	2	0	2	a1, a3, b3, c1, d3
Week-5	Computer Training and Help Systems	4	2	0	2	a1, a4, b1, c2, d1, d2
Week-6	Computer-Supported Cooperative Work (CSCW)	4	2	0	2	a1, a4, b1, c2, d1, d2
Week-7	Information Search and Visualization	4	2	0	2	a2, a4, b1, b2, c3, d2
Week-8	Midterm Exam.					
Week-9	Information Search and Visualization	4	2	0	2	a2, a4, b1, b2, c3, d2
Week-10	Hypermedia and the World Wide Web	4	2	0	2	a1, a2, b1, b2, c3, d3
Week-11	Hypermedia and the World Wide Web	4	2	0	2	a1, a2, b1, b2, c3, d3
Week-12	Formal Models of Human-Computer Interaction	4	2	0	2	a1, a3, b1, c1, d4
Week-13	Formal Models of Human-Computer Interaction	4	2	0	2	a1, a3, b1, c1, d4
Week-14	Practical Exam					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓			✓					



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7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	10	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	0	0	0%
7	Assignments / Project	6,12	10	10%
8	Field training	0	0	0%
9	Other (Mention)	0	0	0%



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8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	• Shneiderman, B., & Plaisant, C. (2016). Designing the User Interface: Strategies for Effective Human-Computer Interaction (6th ed.). Pearson. • Norman, D. (2013). The Design of Everyday Things (Revised & Expanded Edition). Basic Books.
	Other References	None
	Electronic Sources (Links must be added)	• Nielsen, J. (2000). Designing Web Usability: The Practice of Simplicity. New Riders. • Krug, S. (2014). Don't Make Me Think, Revisited: A Common Sense Approach to Web Usability (3rd ed.). New Riders.
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

Course Code: CS 330

Course Name: Information Visualization

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 3		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 104							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Rania Ragab Hussien 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

The purpose of this course is to introduce students to the key theoretical and practical concepts and issues in this fast-growing discipline. Knowledge of information visualization concepts has a wide range of applications. Information visualization has applications in construction, medicine, education, parallel and distributed systems programming, interactive multimedia, security systems, engineering systems, information booths, digital libraries, virtual environments, and almost any visually based computer program.



3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a1. Demonstrate a solid understanding of the fundamental theories and principles of information visualization, including data representation, human perception, and cognitive load.
- a2. Understand how information visualization is applied in various industries, such as construction, medicine, education, and virtual environments.
- a3. Gain knowledge of key visualization techniques and tools for both structured and unstructured data, and understand how to choose the appropriate method for different data sets.
- a4. Understanding of how information visualization is related to HCI, including user interface design and user experience.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Evaluate and compare different visualization techniques, considering effectiveness, usability, and efficiency in conveying information.
- b2. Apply visualization techniques to solve complex, data-driven problems in a variety of contexts, such as engineering systems, digital libraries, or parallel and distributed systems.
- b3. Develop new and innovative approaches to information visualization by integrating theoretical principles with practical design considerations.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Proficiency in using state-of-the-art software and tools for designing and implementing
- c2. Design and implement information visualization projects, from initial concept through to evaluation, that effectively presents data in interactive and meaningful ways.
- c3. Apply professional and ethical considerations, such as privacy and data security, when working with large-scale datasets and visualizations.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Communicate complex information and insights using visual tools to both technical and non-technical audiences.
- d2. Collaborate effectively in multidisciplinary teams, using visualization as a key tool for communication and problem-solving.
- d3. Stay up to date with the latest trends and technologies in information visualization, demonstrating a commitment to continuous learning in a rapidly evolving field.



d4. Use critical thinking skills to make informed decisions on the best visualization methods to solve specific real-world problems.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a2
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a3
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a4
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b3
B6	Evaluate the results of tests to investigate the functionality of computer systems.	b1
B7	Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact	b1,b2
C8	Handle a mass of diverse data, assess risk and draw conclusions.	c1,c2
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c1,c2
C10	Communicate effectively by oral, written, and visual means.	c2,c3
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d3,d4
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d1,d2



D3	Show the use of information-retrieval.	d3
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d4

5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Introduction to Information Visualization	4	2	0	2	a1, b1, c1, d1
Week-2	Applications of Visualization in Different Domains (Construction, Medicine, Education, etc.)	4	2	0	2	a2, b2, c2, d2
Week-3	Visualization Techniques (e.g., Graphs, Maps, Charts, 3D Visualization)	4	2	0	2	a3, b1, c1, d1
Week-4	Human Perception & Cognitive Load in Visualization	4	2	0	2	a4, b3, c2, d3
Week5	Parallel and Distributed Systems Visualization	4	2	0	2	a2, b2, c1, d2
Week-6	Interactive Multimedia & Virtual Environments	4	2	0	2	a2, b2, c2, d1
Week-7	Security Systems Visualization	4	2	0	2	a2, b2, c1, d4
Week-8	Midterm					
Week-9	Digital Libraries and Information Booths	4	2	0	2	a3, b1, c2, d2
Week-10	Information Search and Visualization	4	2	0	2	a4, b3, c1, d1
Week-11	Formal Models of Human Computer Interaction (HCI) for Visualization	4	2	0	2	a4, b3, c2, d3
Week-12	Ethical and Legal Issues in Data Visualization (e.g., Privacy, Data Security)	4	2	0	2	a4, b2, c3, d4
Week-13	Ethical and Legal Issues in Data Visualization (e.g., Privacy, Data Security)	4	2	0	2	a4, b2, c3, d4
Week-14	Practical Exam					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓			✓					



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7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	10	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	0	0	0%
7	Assignments / Project	6,12	10	10%
8	Field training	0	0	0%
9	Other (Mention)	0	0	0%

8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	• "Information Visualization: Perception for Design" by Colin Ware. • "The Visual Display of Quantitative Information" by Edward R. Tufte. • "Visualization Analysis and Design" by Tamara Munzner.



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		• "Data Visualization: A Practical Introduction" by Kieran Healy
	Other References	None
	Electronic Sources (Links must be added)	• FlowingData (flowingdata.com) • Tableau Public (public.tableau.com) • D3.js (d3js.org) • Google Charts (developers.google.com/chart) • Datawrapper (datawrapper.de).
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 331

Course Name: Knowledge representation and reasoning

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level3		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 201							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Sarah Ahmed Soliman					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

By the end of the course, a successful student should be able to understand the principles and operations of knowledge-based systems and be familiar with the design of knowledge bases. Transformation of logical knowledge models into physical knowledge models is investigated. Knowledge representation and case-based reasoning (CBR) techniques are discussed.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Identify the fundamental principles and operational mechanisms of knowledge-based systems, including how they are structured and how they function.
- a.2. Specify the requirements, design and development of knowledge bases, understanding the processes involved in organizing and structuring knowledge for effective use.



- a.3. Discuss the methods for transforming logical knowledge models into physical knowledge models, recognizing the implications of these transformations for system implementation and performance.
- a.4. Understand various techniques for representing knowledge, including different models and approaches used to encode information within knowledge-based systems.
- a.5. Know about case-based reasoning (CBR) techniques, including how past cases are used to inform decision-making and problem-solving in new situations.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Evaluate the principles and operations of knowledge-based systems and assess their effectiveness in solving complex problems.
- b.2. Explain logical knowledge models and transform them into physical knowledge models.
- b.3. Clarify knowledge representation techniques and assess their suitability for different problem domains.
- b.4. Evaluate and apply case-based reasoning (CBR) techniques to knowledge-based system designs.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Design and implement knowledge-based systems that adhere to specified requirements and solve real-world problems.
- c.2. Develop knowledge bases, applying principles of logical and physical knowledge model transformation.
- c.3. Use knowledge representation techniques in the design of intelligent systems.
- c.4. Apply case-based reasoning (CBR) techniques in problem-solving scenarios.
- c.5. Test knowledge-based systems to ensure their accuracy, efficiency, and scalability.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.
- d.2. Demonstrate skills in group working, team management, time management and organizational skills.
- d.3. Show the use of information-retrieval.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a2
A11	Requirements, practical constraints, and computer-based systems.	a1,a2
A14	Demonstrating basic knowledge and understanding of a core of analysis, algebra, applied mathematics and statistics.	a1,a4
A16	The principles and techniques of several application areas informed by the research directions of the subject, such as artificial intelligence, natural language processing, data mining, databases, and computer graphics.	a1,a3
A18	The fundamental topics in Computer Science, including hardware and software architectures, software engineering principles and methodologies, operating systems, compilers, parallel and distributed computing, systems, and software tools.	a1,a4
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1,b2
B4	Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints.	b1,b3
B9	Evaluate research papers in a range of knowledge areas	b1
B19	Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.	b2,b4
C6	Design, implement, maintain, and manage software systems.	c1,c5
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c2,c3
C11	Perform independent information acquisition and management, using scientific literature and Web sources.	c2
C15	Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.	c5
C18	Apply and manage the need for continuing professional and practical development in recognition of the need for life long-learning.	c4,c5
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d2
D3	Show the use of information-retrieval.	d3



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5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Introduction to Knowledge-Based Systems	4	2	-	2	a1,b1
Week-2	Introduction to Knowledge-Based Systems part 2	4	2	-	2	a1,b1
Week-3	Introduction to Knowledge-Based Systems part 2	4	2	-	2	a2,a3,b2,c2
Week-4	Knowledge Representation Techniques	4	2	-	2	a4,b3,c3,d1
Week5	Knowledge Representation Techniques part 2	4	2	-	2	a4,b3,c3,d1
Week-6	Methods for designing and constructing knowledge bases	4	2	-	2	a2,c1,c2,c3,d3
Week-7	Tools and software for designing knowledge bases	4	2	-	2	a2,c1,c2,c3,d3
Week-8	Midterm Exam.					
Week-9	Case-Based Reasoning (CBR) Techniques	4	2	-	2	a5,b4,c4,d3
Week-10	Integration of CBR with other KBS methodologies	4	2	-	2	a5,b4,c4,d3
Week-11	Advanced Topics in KnowledgeBased Systems	4	2	-	2	c1,c3,c4
Week-12	Advanced Topics in KnowledgeBased Systems	4	2	-	2	c1,c3,c4
Week-13	Practical Applications and Case Studies	4	2	-	2	c1,c2,c3,c4,c5,da,d2,d3
Week-14	LAB examination					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓				✓	✓								

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	5	5%
2	Quiz 2 written (Semester work)	13	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	-
7	Assignments / Project	All Weeks	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Lecturer Notes (PDF file, Presentation, and Word documents)
	Other References	Knowledge-Based Systems: Fundamentals and Applications, Joseph Giarratano, Gary Riley, 6th Edition (2022)
	Electronic Sources (Links must be added)	www.ekb.eg
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Sarah Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 332

Course Name: Data Warehouses

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level3		
Term/ Academic year	Oct.	2025/2026			Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 204							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr.Shaimaa abdallah					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course provides an introduction to Data Warehousing, Evolution of DSS, DW General Topics, Data Warehouse Structure: Granularity, Data Warehouse Design, Building Dimensional DW, OLAP tools, Aggregates, ELT- Extraction/Transformation/ Load processes and tools, Issues of DW Architecture, Enterprise DW vs. Data Marts, DW and Data Mining.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1.Understand the core principles of Data Warehousing, including the evolution of Decision Support Systems (DSS).
- a.2.Describe Data Warehouse design and structure, with a focus on granularity, dimensional design, and architecture.



- a.3. Explain the ELT processes and tools, as well as the role of OLAP tools and Aggregates in data analysis.
- a.4. Differentiate between Enterprise Data Warehouses and Data Marts, and recognize their roles in supporting Data Mining and organizational decision-making.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Analyze and evaluate design requirements for Data Warehousing systems, focusing on granularity and dimensional modeling.
- b.2. Apply analytical techniques using OLAP tools and Aggregates for effective data analysis and reporting.
- b.3. Assess and address architectural issues in Data Warehousing, including scalability and performance challenges.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Design and implement robust Data Warehouse solutions, utilizing dimensional modeling techniques to enhance data organization and accessibility.
- c.2. Show execute ELT (Extraction, Transformation, Load) processes effectively, using a variety of tools to ensure efficient data integration and preparation.
- c.3. Utilize OLAP tools for data analysis and reporting, enabling users to derive actionable insights from complex datasets.
- c.4. Conduct performance tuning and optimization of Data Warehouse systems, addressing issues related to scalability and responsiveness.
- c.5. Perform thorough testing and validation of Data Warehouse implementations, ensuring data accuracy and reliability for decision-making purposes.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Develop and deploy the database management system to solve some real-world Problems.
- d2. Implement SQL to query data in database management systems.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1,a2
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a2,a4
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a3
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a3,a4
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1
B4	Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints.	b1,b3
B10	Define traditional and nontraditional problems, set goals towards solving them, and. observes results.	b2,b3
C2	Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.	c2
C4	Apply computing information retrieval skills in computing community environment and industry.	c3
C6	Design, implement, maintain, and manage software systems.	c1,c4
C8	Handle a mass of diverse data, assess risk and draw conclusions.	c3,c5
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c1,c2,c4
D3	Show the use of information-retrieval.	d2
D5	Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.	d1



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5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Introduction to Data warehousing (Concepts, Operational and informational systems, Decision support systems and Applications of data warehouse)	4	2	-	2	a1, b1
Week-2	Data warehouse architecture(Source systems,Process flow, Extract & load process & load manager Clean & transform data & warehouse manager)	4	2	-	2	a2, b2
Week-3	Data warehouse architecture(Query manager,Detailed & Summarized information,Backup and archive process,Data staging area & presentation servers).	4	2	-	2	a2, b2, c1,c2, d2
Week-4	Data Warehouse Design(ER modeling vs. Dimensional modeling,Online Analytical Processing (OLAP),ROLAP,MOLAP &HOLAP.	4	2	-	2	a2,a3, b2, c1, d2
Week5	Data Warehouse Design(Database schema and Dimensional Modeling, Facts, Dimensions, Fact & Dimension Tables, Star, Snowflake & Starlike schemas).	4	2	-	2	a2,a3,a4 b2,b3, c1, d2
Week-6	Case Study: Data Warehouse for a Grocery Store.	4	2	-	2	c1, c2,c3,c4 d1, d2
Week-7	Revision.	4	2	-	2	Revision
Week-8	Midterm Exam.					
Week-9	Advanced dimensional modeling concepts (Surrogate keys-Slowly changing dimensions-Rapidly changing dimensions-Conformed dimensionsFactless fact tables-	4	2	-	2	a1, a2, b2, b3, c2,c5, d2



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	MinidimensionsOutriggers-Role-playing dimensions)					
Week-10	Multi-dimensional databases (MDDBs)	4	2	-	2	a1, a2, b2, b3, c2,c4,c5, d2
Week-11	Performance enhancing techniques(Partitioning-AggregationMaterialization of views-Bitmap indexes Parallel processing)	4	2	-	2	a1, a2, b2, b3, c2,c5 d2
Week-12	Data Marts(Architecture-Design-Cost)	4	2	-	2	a1, a2, b2, b4, c1,c5, d2
Week-13	Metadata and Data Warehouse Project Management	4	2	-	2	a1, a2, b1, b2, b4,b5,c1, c2,c4,c5, d2
Week-14	LAB Examination					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓			✓	✓	✓								

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	5	5%
2	Quiz 2 written (Semester work)	13	5	5%
3	Midterm exam	7	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	-
7	Assignments / Project	All weeks	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Lecturer Notes (PDF file, Presentation, and Word documents)
	Other References	The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling" (3rd Edition) by Ralph Kimball and Margy Ross (2020).
	Electronic Sources (Links must be added)	www.ekb.eg/
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr.Shaimaa abdallah	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 333

Course Name: Decision Support Systems and Applications

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level Three		
Term/ Academic year	Feb.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	BS 201							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Mona Mohamed Fouad					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course provides Approaches and techniques to construct and implement effective computer-based Decision Support Systems (DSS). Alternative software development tools or generators of a DSS. The role of computational tools (simulation, optimization, statistical, and other quantitative models) and computer information systems (MIS, AI, and ES) to support and enhance the capability of the DSS. Discussion and analysis of real-life case studies of integrated DSS are stressed throughout the course.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Define and describe Decision Support Systems (DSS).
- a.2. Understand the components and architecture of a DSS.
- a.3. Identify different types of DSS (e.g., data-driven, model-driven, knowledge-driven).



- a.4.Explain the role of computational tools (simulation, optimization, statistical models) in DSS.
- a.5.. Demonstrate and apply various computational techniques to solve decision problems.
- a.6.Understand the relationship between DSS and other information systems (MIS, AI, ES).
- a.7.Understand the ethical implications of DSS development and use.
- a.8.Adhere to ethical guidelines and regulations related to data privacy, security, and fairness.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1.Analyze decision problems and identify relevant information.
- b.2. Develop appropriate models and algorithms to address decision problems.
- b.3.Evaluate alternative solutions and make informed decisions.
- b.4.Critically assess the effectiveness of DSS in real-world applications.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1 Develop DSS using software development tools
- c.2 Test and evaluate the performance of DSS.
- c.3 Identify best practices and lessons learned from successful DSS implementations.
- c.4 Apply new knowledge and techniques to improve the effectiveness of DSS solutions.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1.Collaborate with team members to develop and implement DSS.
- d.2.Proficiency in using various software tools and applications.
- d.3.Stay updated on advancements in DSS technology and methodologies.
- d.4.Continuously develop skills and knowledge in the field of decision support.
- d.5.Deliver presentations that are informative, engaging, and persuasive.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1,a2,a3
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a5
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a4



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Course Specification

A9	Professional, moral, and ethical issues involved in the exploitation of computer technology and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.	a7,a8
A16	The principles and techniques of several application areas informed by the research directions of the subject, such as artificial intelligence, natural language processing, data mining, databases, and computer graphics.	a6
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1
B4	Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints..	b2
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b3
B17	Identify a range of solutions and critically evaluate and justify proposed design solutions.	b4
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c1
C7	Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.	c2
C16	Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.	c3
C18	Apply and manage the need for continuing professional and practical development in recognition of the need for life long-learning.	c4
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d1
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d2,d3,d4
D6	Reveal communication skills, public speaking and presentation skills, and delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.	d5



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Introduction to Decision Support Systems (DSS)	4	2	0	2	a1, a2
Week-2	Approaches and Techniques for Building Effective DSS part I	4	2	0	2	a4, a5, c1, d2
Week-3	Approaches and Techniques for Building Effective DSS part II	4	2	0	2	a4, a5, c1, d2
Week-4	Software Development Tools and Generators for DSS	4	2	0	2	a5,b1,b2,c1,d1,d2
Week5	Computational Tools for Supporting DSS.	4	2	0	2	a4,a5,b2,d1,d3,d2
Week-6	Integration with Computer Information Systems. Management Information Systems (MIS) and DSS integration. Artificial Intelligence (AI) and Expert Systems (ES) for DSS.	4	2	0	2	a6,c4,d3,d4
Week-7	Integration with Computer Information Systems. Data warehousing and business intelligence for DSS DSS and enterprise systems integration	4	2	0	2	a6,c4,d3,d4
Week-8	Midterm Exam.					
Week-9	Case Studies and Real-Life Applications	4	2	0	2	b3,b4,c2,c3,d1,d2
Week-10	DSS Evaluation and Performance Measurement	4	2	0	2	b3,b4,c2,c3,d3
Week-11	DSS Evaluation and Performance Measurement	4	2	0	2	b3,b4,c2,c3,d3
Week-12	Ethical Considerations and Data Privacy	4	2	0	2	a7,a8,c4
Week-13	Emerging Trends and Future Directions	4	2	0	2	b4,c4,d4
Week-14	Lab Exam					

6- Teaching and Learning and Assessment methods:



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Computer Science Department**

Course Specification

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓	✓		✓	✓								

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5 %
2	Quiz 2 written (Semester work)	11	5	5 %
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10 %
6	Final Oral Exam	0	0	0
7	Assignments / Project	weekly	10	10 %
8	Field training	0	0	0
9	Other (Mention)	0	0	0



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	- "Business Intelligence and Analytics: Systems for Decision Support" by Ramesh Sharda, Dursun Delen, and Efraim Turban (10th Edition, 2020). - Case studies and other academic publications as they are assigned during the course.
	Other References	None
	Electronic Sources (Links must be added)	- Decision Support Systems Society (DSS Society): The professional society for decision support systems, offering resources, conferences, and publications. - INFORMS: The Institute for Operations Research and Management Science, a leading professional society in the field of operations research and management science. - Association for Computing Machinery (ACM): A professional society for computing professionals, with a special interest group on decision support systems. - Decision Support Systems Blog: A blog dedicated to providing news, articles, and insights on decision support systems.
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Mona Mohamed Fouad	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 334

Course Name: Object Oriented Databases

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level3		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 204							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr.Shaimaa abdallah					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course provides history of data models, Semantic data models, Problems in recordoriented models, Object data model, Classes and inheritance, Methods and messages, Multiple inheritance, Object queries, Object query language OQL, Indexing in object databases, Processing object queries, Object transactions, Concurrency control in object databases, Security in object databases, Using the object model in advanced. applications.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Define semantic data models, core components of the object data model, and the concepts of classes and inheritance within the object-oriented database paradigm.



- a.2. Describe the syntax and capabilities of Object Query Language (OQL) and how it enables querying and manipulation of object-oriented data structures effectively.
- a.3. Describe concurrency control mechanisms and their role in managing simultaneous database operations.
- a.4. Identify key security concerns and mechanisms in object-oriented databases.
- a.5. Analyze how object-oriented databases address complex problems and support advanced application requirements.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Assess the strengths and weaknesses of object-oriented databases compared to other database models, identifying scenarios where object-oriented solutions offer significant advantages.
- b.2. Create strategies for optimizing object-oriented database performance, including query processing, indexing, and transaction management, to ensure efficient and reliable data handling.
- b.3. Apply theoretical concepts of object-oriented databases, such as object queries and concurrency control, to practical scenarios, demonstrating the ability to translate abstract principles into actionable solutions.
- b.4. Propose innovative approaches to enhance object-oriented database systems, incorporating advanced features and techniques to address emerging trends and challenges in the field.
- b.5. Formulate strategies for managing and mitigating potential issues in object-oriented databases, including problems related to multiple inheritance, security, and concurrency control.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Develop and deploy practical object-oriented database applications, demonstrating the ability to translate design concepts into functional systems using appropriate tools and technologies.
- c.2. Construct and execute queries using Object Query Language (OQL) to effectively retrieve and manipulate data from object-oriented databases.
- c.3. Apply advanced features of object-oriented databases, such as multiple inheritance and complex object queries, to develop sophisticated and scalable database solutions.
- c.4. Apply advanced features of object-oriented databases, such as multiple inheritance and complex object queries, to develop sophisticated and scalable database solutions.
- c.5. Implementation projects, including planning, resource allocation, and timeline management to deliver successful outcomes.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Utilize creative and innovative thinking to address and solve complex problems in database design and implementation, applying advanced object-oriented techniques and methodologies.
- d.2. Produce comprehensive and well-organized documentation for database projects, including design specifications, user manuals, and technical reports.
- d.3. Work effectively as a member/leader of a team of technical people who may plan, design, Implement, manage, and monitor a project.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1,a2
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development.	a3,a4
A11	Requirements, practical constraints, and computer-based systems.	a3,a5
A18	The fundamental topics in Computer Science, including hardware and software architectures, software engineering principles and methodologies, operating systems, compilers, parallel and distributed computing, systems, and software tools.	a1,a3,a4
A19	Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing.	a5
B8	Familiar with the professional, legal, moral, and ethical issues relevant to the computing industry.	b5
B10	Define traditional and nontraditional problems, set goals towards solving them, and. observes results.	b1,b3
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b1,b2
B17	Identify a range of solutions and critically evaluate and justify proposed design solutions.	b3,b4
B19	Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.	b4,b5
C3	Deploy the equipment and tools used for the construction, maintenance, and documentation of computer applications.	c1,c5
C6	Design, implement, maintain, and manage software systems.	c1,c3,c4
C7	Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.	c3,c5
C12	Prepare and present seminars to a professional standard.	c5
C18	Apply and manage the need for continuing professional and practical development in recognition of the need for life long-learning.	c1,c5
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d3
D3	Show the use of information-retrieval.	d2
D7	Show the use of general computing facilities.	d1



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5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Introduction and History of Data Models	4	2	-	2	a1,a2
Week-2	Semantic Data Models	4	2	-	2	a1,d4
Week-3	Problems in Record-Oriented Models	4	2	-	2	a1,b1, b2, b3,c1, d1
Week-4	Object- Data Models	4	2	-	2	a1,a2 b2, b3,c1,c3
Week5	Classes and Inheritance	4	2	-	2	a1,a2 ,b1, b2,c3,c4
Week-6	Methods and Message Passing	4	2	-	2	a3,b2,b3,c3,c2
Week-7	Multiple Inheritance	4	2	-	2	a1a2,b1,b2,b3,c4,c2
Week-8	Midterm Exam.					
Week-9	Object Queries (Object Query Language (OQL)	4	2	-	2	a2, b1,b2,b3, c1,c2,c3 d1
Week-10	Indexing in Object Databases	4	2	-	2	a2 b1, b2,b3, c4, c5,c3
Week-11	Processing Object Queries	4	2	-	2	a2,a3,b2, b3, c2, c3,c4,d1
Week-12	Object Transaction Concurrency Control in Object Database	4	2	-	2	a2, a3, b2,b4, , c1, c4, c5, d3, d4,d1,d2
Week-13	Advanced Applications of ObjectOriented Database	4	2	-	2	a5, b4, b5, b1, b2, b3, c2, c4, c5,d1,d2,d3
Week-14	LAB Exam					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓		✓			✓	✓								

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	5	5%
2	Quiz 2 written (Semester work)	6	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	-
7	Assignments / Project	All weeks	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Lecturer Notes (PDF file and Presentation)
	Other References	- Abraham Silberschatz, Henry Korth, S. Sudarshan, Database System Concepts" (Chapters on Object-Oriented Databases) . "Object Database Management: A Practical Overview" by P. Atkinson, W. Kent - David C. Hay, "Object-Oriented Databases: Concepts and Applications"
	Electronic Sources (Links must be added)	- Oracle Object-Relational Database concepts Oracle Object-Relational Database Concepts. - GeeksforGeeks: Object-Oriented Database Management System (OODBMS) GeeksforGeeks: OODBMS.
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Shaimaa abdallah	Dr. Rania Ragab Hussien
Signature		



1Course Code: CS 335

Course Name: Multimedia Information Systems

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level3		
Term/ Academic year	Oct.	2025/2026			Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 205							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr.Shaimaa abdallah					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course provides multi-dimensional data structure (K-d tree, Point trees, M-X trees and R trees). Image database and the different techniques of compression and segmentation. An overview about the text/document database, Video database and Audio one.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1.Understand the principles of multi-dimensional data structures.
- a.2.Comprehend the fundamentals of image databases.
- a.3.Recognize the key features of text, video, and audio databases.
- a.4.Understand the challenges of multi-media data management.



b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Analyze and evaluate multi-dimensional data structures.
- b.2. Demonstrate understanding of image compression and segmentation techniques.
- b.3. realize ability to compare and contrast different media databases .

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Implement multi-dimensional data structures.
- c.2. Implement image compression and segmentation techniques.
- c.3. Design and manage text, video, and audio databases. c4. Develop practical solutions for multi-media data management.....

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Communicate technical concepts effectively.
- d.2. Work collaboratively to manage media databases.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1,a2
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a3,a4
A12	Essential mathematics relevant to computer science.	a1
A13	Using of high-level programming languages.	a2,a3
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1,b2
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b2,b3
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b1,b3
C4	Apply computing information retrieval skills in computing community environment and industry.	c3
C8	Handle a mass of diverse data, assess risk and draw conclusions.	c4
C11	Perform independent information acquisition and management, using scientific literature and Web sources.	c1,c2
C18	Apply and manage the need for continuing professional and practical development in recognition of the need for life long-learning.	c3,c4
D3	Show the use of information-retrieval.	d1
D7	Show the use of general computing facilities.	d2



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5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Introduction to Multimedia Information Systems.	4	2	-	2	a1,a2
Week-2	Multi-Dimensional Data Structures.	4	2	-	2	a2,b1
Week-3	Multi-Dimensional Data Structures.	4	2	-	2	a2,b1
Week-4	Image Databases.	4	2	-	2	a2, b2
Week5	Text/Document Databases.	4	2	-	2	a3,b2,b3
Week-6	Video Databases.	4	2	-	2	a3,b2,b3
Week-7	Audio Databases.	4	2	-	2	a3,a4,b2,b3
Week-8	Midterm Exam.					
Week-9	Integrating Multimedia Databases.	4	2	-		a4,b3,c1,c2,c3,d1
Week-10	Practical Applications.	4	2	-	2	b3, c1,c2,c3,c4,d1
Week-11	Group Work and Presentations.	4	2	-	2	c1,c2,c3,c4,d1,d2
Week-12	Future Trends and Technologies	4	2	-	2	c4,d1,d2
Week-13	Revision	4	2	-	2	a4,b3c4
Week-14	LAB Exam					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓			✓	✓	✓		✓						

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	5	5%
2	Quiz 2 written (Semester work)	13	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	-
7	Assignments / Project	All Weeks	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	• Lecturer Notes (PDF file, Presentation, and Word documents). • Handbook of Multimedia for Digital Entertainment and Arts" edited by David L. Poole and Peter Stone, 2021.
	Other References	• Digital Image Processing" by Rafael C. Gonzalez and Richard E. Woods, 2020 (4th Edition)
	Electronic Sources (Links must be added)	• None
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr.Shaimaa abdallah	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

Course Code: CS 341

Course Name: Internet of Things (IoT)

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level3		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	4		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 310							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Mona Mohamed Fouad					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course teaches a deep understanding of IoT technologies from the ground up. Students will learn IoT device programming (Arduino and Raspberry Pi), sensing and actuating technologies, IoT protocol stacks (Zigbee, 5G, NFC, MQTT, etc.), networking backhaul design and security enforcement, data science for IoT, and cloud based IoT platforms such as AWS IoT. Students will be guided through laboratory assignments designed to give them practical real-world experience, where they will deploy a distributed Wi-Fi monitoring service, a cloud based IoT service platform serving tens of thousands of heartbeat sensors, and more. Students will emerge from the class with a cutting-edge education in this rapidly emerging technology segment, and with the confidence to carry out tasks they will commonly encounter in industrial settings.



3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Define concepts, principles and theories relating to IoT.
- a.2. Describe modeling and design of IoT systems bearing in mind the trade-offs.
- a.3. Describe criteria and specifications appropriate to IoT problems, and plan strategies for their solution.
- a.4. Define the extent to which an IoT system meets the criteria for its current use and future development.
- a.5. Identify the current and underlying technologies that support IoT communication.
- a.6. Define ethical issues involved in IoT technology and be guided by the ethical and legal practices relevant to the computing and information industry.
- a.7. Define requirements and practical constraints IoT system

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Realize the concepts, principles, theories and practices behind IoT as an academic discipline.
- b.2. Explain criteria to measure and interpret the appropriateness of an IoT system for its current deployment and future evolution.
- b.3. Set judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact of an IoT system.
- b.4. Highlight legal, moral and ethical issues relevant to IoT Industry.
- b.5. Evaluate research papers in IoT knowledge areas.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Operate a simple IoT system, recognizing its capabilities and limitations.
- c.2. Deploy the equipment and tools used for the construction, maintenance, and documentation of an IoT system.
- c.3. Assess the safety aspects involved in the operation of computing equipment used in IoT system.
- c.4. Handle a mass of diverse data received from IoT sensors, assess risk, and draw conclusions

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Collaborate effectively in multidisciplinary teams to design, implement, and troubleshoot IoT projects, demonstrating strong teamwork and leadership skills.
- d.2. Show the use of sensors, Internet, and servers in IoT system.
- d.3. Analyze and interpret complex data sets generated by IoT systems, drawing meaningful insights and presenting them.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a2
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a3
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development.	a4
A6	The current and underlying technologies that support computer processing and inter-computer communication.	a5
A9	Professional, moral, and ethical issues involved in the exploitation of computer technology and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.	a6
A11	Requirements, practical constraints, and computer-based systems.	a7
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.	b2
B7	Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact.	b3
B8	Familiar with the professional, legal, moral, and ethical issues relevant to the computing industry.	b4
B9	Evaluate research papers in a range of knowledge areas	b5
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c1
C3	Deploy the equipment and tools used for the construction, maintenance, and documentation of computer applications.	c2
C7	Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.	c3
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c4



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Course Specification

D2	Demonstrate skills in group working, team management, time management and organizational skills.	d1
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d3
D7	Show the use of general computing facilities.	d2

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			Lec.	Tut.	Lab.	
Week -1	Introduction to IoT.	4	2	-	2	a1,b1
Week-2	IoT communication technology.	4	2	-	2	a1.a3,a5,b1,c2,d2
Week-3	Industrial IoT.	4	2	-	2	a1.a3,a5,b1,b5,c2,d2
Week-4	Smart City and IoT	4	2	-	2	a3.a4,a7,b4,b5,c2,d2
Week5	Wired Communications Technologies 4	4	2	-	2	a5,a7,b2,d3
Week-6	Short Range Wireless Communications Technologies	4	2	-	2	a5,a7,b2,d3
Week-7	LPWA technology.	4	2	-	2	a5,a7,b2,d3
Week-8	Midterm Exam.					
Week-9	5G Communication Technology Details.	4	2	-	2	a5,a7,b5,c2,d3
Week-10	Protocols for IoT.	4	2	-	2	a1,a3,a5,a7,b1 b4, c2, d1
Week-11	Industrial and home Gateway Scenarios	4	2	-	2	a5, a7, b3, b4, c2, d1,d2
Week-12	AT Commands of the GPRS Communication Module	4	2	-	2	a5, a7, b3, b4, c2, d1,d2
Week-13	IoT Security Technologies and Ethics and policy of IoT.	4	2	-	2	a6,a7,b4,b5,c3,c4,d1, d2,d3
Week-14	LAB Examination					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓			✓	✓	✓								

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	5	5%
2	Quiz 2 written (Semester work)	6	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	-
7	Assignments / Project	All Weeks	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	- Lecturer Notes (PDF file, Presentation, and Word documents). - Sudip Misra, Anandarup Mukherjee, Arijit Roy, "Introduction to IoT", 1 st edition, Cambridge University Press, 2021.
	Other References	Charles Crowell, "Internet of Things for Beginners", 1 st edition, independently published, 2020
	Electronic Sources (Links must be added)	None.
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Mona Mohamed Fouad	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

Course Code: CS 342

Course Name: E-Learning

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level3		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 310							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Rania Ragab Hussien					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course covers development and deployment of successful e-learning systems; the advantages as well as the possible pitfalls of e-learning; Different means of delivering e-learning and the advantages and disadvantages associated with each; intelligent tutoring systems; adaptive hypermedia; and user modeling; evaluation and maintenance of an e-learning system.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Understand the core concepts and principles involved in the development and deployment of e- learning systems.
- a.2. Describe the advantages and challenges of e-learning compared to traditional education methods.



- a.3. Identify and compare different delivery methods of e-learning (e.g., Learning Management Systems, virtual classrooms, mobile learning) and evaluate their effectiveness in different contexts.
- a.4. Comprehend the functioning and role of intelligent tutoring systems (ITS) in personalized learning experiences.
- a.5. Understand the concepts of adaptive hypermedia and how they can enhance learner engagement by personalizing content delivery.
- a.6. Explain the process of user modeling and its importance in creating adaptive and personalized e- learning environments.
- a.7. Demonstrate knowledge of evaluation and maintenance techniques to ensure the continuous effectiveness and scalability of e-learning systems.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Critically analyze e-learning systems to assess their strengths and weaknesses, identifying areas for improvement.
- b.2. Develop problem-solving strategies to address common issues in e-learning, such as user engagement and technical challenges.
- b.3. Evaluate different e-learning delivery methods and select the most suitable approach for a specific educational or corporate context.
- b.4. Apply principles of ITS and adaptive hypermedia to design personalized learning experiences.
- b.5. Assess the effectiveness of e-learning systems using qualitative and quantitative metrics.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Design and develop a functional e-learning system from the ground up, using modern technologies and platforms.
- c.2. Deploy an e-learning system in a real-world environment, considering factors like scalability, security, and user accessibility.
- c.3. Integrate intelligent tutoring systems to enhance learning experiences with personalized support.
- c.4. Implement adaptive hypermedia systems that adjust content delivery based on learner preferences and performance.
- c.5. Evaluate and maintain an e-learning system, ensuring continuous improvement based on learner feedback and technological advancements.
- c.6. Apply project management skills in the end-to-end development and deployment of e-learning systems.....

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Demonstrate critical thinking and problem-solving skills applicable to a wide range of challenges in e-learning and other domains.
- d.2. Collaborate and communicate effectively within teams, conveying complex ideas and solutions clearly to technical and non-technical stakeholders.



- d.3. Manage projects effectively, including time management, resource allocation, and task prioritization.
- d.4. Adapt to new tools, technologies, and methods in the rapidly evolving field of e-learning.
- d.5. Analyze data and feedback to make evidence-based decisions that improve system design and learner outcomes.
- d.6. Apply digital literacy skills across a variety of platforms and technologies, enhancing their overall technical competency in modern digital environment

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a3
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a7
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a2
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development.	a7
A6	The current and underlying technologies that support computer processing and inter-computer communication.	a5
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a4,a6
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b2
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.	b3
B4	Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints.	b5
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b4



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C1	Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.	c2
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c1
C3	Deploy the equipment and tools used for the construction, maintenance, and documentation of computer applications.	c6
C4	Apply computing information retrieval skills in computing community environment and industry.	c5
C5	Develop a range of fundamental research skills, using online resources, technical repositories and library-based material.	c3,c4
C6	Design, implement, maintain, and manage software systems.	c1,c5
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d2,d3
D3	Show the use of information-retrieval.	d5
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d2,d6
D5	Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.	d5
D6	Reveal communication skills, public speaking and presentation skills, and delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.	d2



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Course Specification

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Introduction to E-learning Systems	4	2	-	2	a1, a2, a3, b1, c1, d1, d2
Week-2	Development of E-learning Systems	4	2	-	2	a1, a3, b1, b3, c1, c2, d3, d4
Week-3	Deployment of E-learning Systems	4	2	-	2	a1, a3, b1, b3, c2, c6, d3, d5
Week-4	Advantages and Pitfalls of E-learning	4	2	-	2	a2, b1, b2, c1, d1, d4
Week5	Means of Delivering E-learning	4	2	-	2	a3, a4, b3, c2, c3, d1, d3
Week-6	Intelligent Tutoring Systems (ITS)	4	2	-	2	a4, a5, b3, b4, c3, c5, d4
Week-7	Adaptive Hypermedia	4	2	-	2	a5, a6, b4, c4, d5
Week-8	Midterm Exam.					
Week-9	User Modeling in E-learning	4	2	-	2	a6, b4, c4, d6
Week-10	Evaluation of E-learning Systems	4	2	-	2	a7, b5, c5, d5
Week-11	Maintenance and Scalability of Elearning Systems	4	2	-	2	a7, b5, c5, c6, d3, d5
Week-12	Emerging Trends in E-learning	4	2	-	2	a1, a5, b1, c3, c4, d1, d4
Week-13	Capstone Project/Practical Application	4	2	-	2	a1, a3, a7, b2, b5, c1, c2, c6, d1, d3, d6
Week-14	Practical lab examination					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓			✓	✓	✓		✓						

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	5	5%
2	Quiz 2 written (Semester work)	13	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	-
7	Assignments / Project	All Weeks	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	- Lecturer Notes (PDF file, Presentation, and Word documents). - Clark, R. C., & Mayer, R. E. (2016). E-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning (4th ed.). Wiley. - Horton, W. (2011). E-Learning by Design (2nd ed.). Wiley. - Ally, M. (Ed.). (2009). Mobile Learning: Transforming the Delivery of Education and Training. Athabasca University Press. - Garrison, D. R., & Anderson, T. (2003). E-Learning in the 21st Century: A Framework for Research and Practice. Routledge.
	Other References	- Aleven, V., McLaughlin, E. A., & Koedinger, K. R. (2016). Intelligent Tutoring Systems: A Guide to Building the Best AI Tutors for Learning. Springer. - Brusilovsky, P., & Millán, E. (2007). User Models for Adaptive Hypermedia and Adaptive Educational Systems. Springer.
	Electronic Sources (Links must be added)	- Educause Review – https://er.educause.edu/ - Learning Management Systems (LMS) Guide – https://www.learningmanagementsystem.com/ - The International Review of Research in Open and Distributed Learning (IRRODL) – http://www.irrodl.org/ - Coursera Blog on Learning and Technology – https://blog.coursera.org/category/learning-tech/
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)
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Course Specification



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

Course Code: CS 403

Course Name: Artificial Intelligence

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory			Academic level at which the course is taught	Level 3		
Term/ Academic year	Feb.		2025/2026		Credit Hours:		3
Contact Hours	Lecture:	2	Tutorial:		Lab.:	2	Total 4
Pre-Requisite	CS 304						
Academic standards			NARS 2010				
Bylaw Approval			2022				
Course Coordinator			Dr/Sarah Ahmed Soliman				
Course Specification Approval			Department Council				
Course Specification Approval Date			20/8/2025				

2. Course Overview:

This course introduces students to the basic concepts and methods of artificial intelligence from a computer science perspective. The course will emphasize the selection of data representations and algorithms useful in the design and implementation of intelligent systems. It contains an overview of one of the AI languages and some discussion of important applications of artificial intelligence methodology.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1.Demonstrate basic knowledge and understanding of a core idea of artificial Intelligence and its application areas.
- a.2.Understand the principles and techniques of a number of application areas informed by the different types of intelligent agents.
- a.3.Show a critical understanding of the principles of artificial intelligence.
- a.4.Understand the fundamental topics for state-space search algorithms in the modeling and designing of AI systems.



a.5. Select advanced topics to provide a deeper understanding of some aspects of the basic knowledge representation, problem solving, and learning methods of Artificial Intelligence.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Define traditional and nontraditional problems, set goals towards solving them, with observing the results.
- b.2. Perform comparisons between (algorithms, methods,...etc) in the used AI searching.
- b.3. Perform classifications of (data, results, algorithms.. etc.) considering the most suitable knowledge representation for solving the problem.
- b.4. Summarize the search algorithms and their results.
- b.5. Identify a range of solutions and critically evaluate and justify proposed types of artificial agents considering the environments characteristics.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Use appropriate programming languages, like Python language, web-based systems and tools, design methodologies, and knowledge to develop a small logic-based, rule-based, and search-based systems.
- c.2. Perform independent information acquisition and management, using scientific literature and Web sources.
- c.3. Develop AI agents through specification, design, and implementation.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Demonstrate the ability to make use of self-assessment ability, critical thinking and analytic ability to manage tasks and resources.
- d.2. Show the use of information-retrieval
- d.3. Demonstrate strong problem-solving and decision-making skills and display mature computer literacy.



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4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A13	Using of high-level programming languages	a.1, a.2, a.3, a.4, a.5
A16	The principles and techniques of several application areas informed by research directions (AI, NLP, data mining, databases, graphics)	a.1, a.2, a.3, a.4, a.5
A17	Showing a critical understanding of the principles of AI, image, and pattern recognition	a.1, a.2, a.3, a.4, a.5
A18	The fundamental topics in CS: architectures, software engineering, OS, compilers, parallel/distributed computing, tools	a.1, a.2, a.3, a.4, a.5
A19	Selecting advanced topics to provide deeper understanding (AI, parallel/concurrent computing, etc.)	a.1, a.2, a.3, a.4, a.5
B10	Define traditional and nontraditional problems, set goals, and observe results	b1
B11	Perform comparisons between algorithms, methods, techniques	b2
B12	Perform classifications of data, results, algorithms, etc.	b3
B14	Summarize proposed solutions and their results	b4
B17	Identify a range of solutions, critically evaluate and justify designs	b5
C9	Use programming languages, web-based systems/tools, design methodologies, and database systems	c1
C11	Perform independent information acquisition & management (literature, web sources)	c2
C14	Specify, design, and implement computer-based systems	c3
D1	Demonstrate ability to manage one's own learning	d1
D2	Demonstrate teamwork, time management, organizational skills	d2
D3	Show the use of information-retrieval	d3



5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab	
Week -1	Introduction to Artificial intelligence.	4	2	-	2	a1, a2, a3
Week-2	Intelligent agent.	4	2	-	2	a2,a4,b1,c3
Week-3	Problem solving: AI as representation and Search. State Space. Search Strategy	4	2	-	2	a2, a4,b2,c1, d3
Week-4	Uninformed (Blind) search techniques (Depth-first, Depth-limited, Breadth-first, and Uniform cost.)	4	2	-	2	a4, a5,b2, b3,c1, c3,d3
Week5	Informed (Heuristic) search techniques: Hill Climbing, Greedy best First, and A*	4	2	-	2	a4, a5,b2, b3,c1, c3,d3
Week-6	Optimization and heuristic search (Hill-climbing search, Simulated annealing)	4	2	-	2	a4, a5,b2, b3,c1, c3,d1,d3
Week-7	Game Tree; Min-Max, Alpha-Beta cut off	4	2	-	2	a4, a5,b2, b3,c1, c3,d1,d3
Week-8	Midterm Exam					
Week-9	Knowledge Representation and Reasoning	4	2	-	2	a5, b1, b4, c1, c2, d3
Week-10	first-order logic and inference.	4	2	-	2	a5, b1, b4, c1, c2, d3
Week-11	Machine Learning: Supervised learning: Regression (linear, logistic),	4	2	-	2	a5, b1,b3, b4, c1, c2,c3, d2, d3
Week-12	Classification (decision trees, support vector machines, neural networks)	4	2	-	2	a5, b1,b3, b4, c1, c2,c3, d2, d3
Week-13	Unsupervised learning: Clustering (k-means)	4	2	-	2	a5, b1,b3, b4, c1, c2,c3, d2, d3
Week-14	LAB AND ORAL EXAM					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓	✓	✓	✓	✓								✓

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	6	5	5%
2	Quiz 2 written (Semester work)	10	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam			
7	Assignments / Project	Through the semester	10	10%
8	Field training			
9	Other (Mention)			



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Russell, S. J., & Norvig, P. (2021). Artificial Intelligence: A Modern Approach (4th ed.). Pearson.
	Other References	• Artificial Intelligence – a modern approach By Stuart J. Russel and Peter Norvig, Publisher Prentice Hall, upper saddle river, New Jersey (3rd edition) • Knowledge Based Information Systems (KBIS) By D. Partridge K.M. Hussain, Publisher Mc Graw-Hill Book Company, London, UK
	Electronic Sources (Links must be added)	• https://www.coursera.org/learn/introduction-to-ai • https://www.udacity.com/course/intro-to-artificial-intelligence--cs271
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr.Sarah Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		

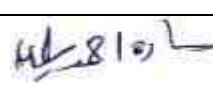


Course Code: CS 404

Course Name: Theory of Operating Systems

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 3		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:		Lab.:	2	Total	4
Pre-Requisite	CS 306							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Sara Ahmed 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course covers in detail many advanced topics in operating system design and implementation. It starts with topics such as operating systems structuring, multithreading and synchronization and then moves on to systems issues in parallel and distributed computing systems. The course will also introduce topics such as virtual memory management, file systems, protection and security, operating system extension techniques, fault tolerance, and the history of systems programming.

3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a1. Identify and explain detailed aspects of internal structures of operating systems.
- a2. List the basic concepts of operating systems, including development, structures, services, functionalities design and implementation.



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- a3. Describe the performance of various scheduling algorithms for memory, I/O devices, files, processes and threads and how they are managed.
- a4. Define the concepts covered in concurrency control, including mutual exclusion and synchronization, deadlock and starvation.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Identify criteria to interpret the relevance of operating system for its current deployment and future evolution.
- b2. Investigate operating system administrative functions based on commonly available operating systems.
- b3. Analyze the results of tests to investigate the functionality of computer systems.
- b4. Set an innovative design to solve concurrency problems.
- b5. Explain secondary storage management.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Discover common operating system issues and errors, applying problem-solving techniques to identify and resolve them.
- c2. Develop software projects and work efficiently within various operating system environments.
- c3. Analyze operating system concepts using a variety of online resources, technical repositories, and library-based materials
- c4. Evaluate the risks and safety concerns in real-world operating system scenarios.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Demonstrating the ability to make use of a range of OS learning resources and to manage one's own learning.
- d2. Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a1,a2,a3
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development.	a2,a4
A10	Current developments in computing and information research.	a1,a3,a4
A11	Requirements, practical constraints, and computer-based systems.	a2
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.	b1
B4	Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints.	b2,b4
B6	Evaluate the results of tests to investigate the functionality of computer systems.	b3
B8	Familiar with the professional, legal, moral, and ethical issues relevant to the computing industry.	b5
B9	Evaluate research papers in a range of knowledge areas	b2,b3,b4
C1	Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.	c1,c2
C3	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c2
C5	Develop a range of fundamental research skills, using online resources, technical repositories and library-based material	c3
C7	Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.	Not covered
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	Not covered
D8	Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.	Not covered



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			ILOs Covered by Course
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
<i>Week -1</i>	Introduction to operating systems and computer structure	4	2	-	2	a1,a2
<i>Week-2</i>	Basic of OSs (Types of OS, functions of OS, network and distributed operating systems, real time systems, Multiprocessor systems.	4	2	-	2	a1, a2,b1
<i>Week-3</i>	Operating-System Structures	4	2	-	2	a2
<i>Week-4</i>	Process and Process Synchronization	4	2	-	2	a2, a4, b4
<i>Week5</i>	CPU scheduling algorithm's part I	4	2	-	2	a3, b1, b3, c1,
<i>Week-6</i>	CPU scheduling algorithm's part II	4	2	-	2	a3, b1, b3, c3,
<i>Week 7</i>	Threads	4	2	-	2	a3, b1, b4
<i>Week-8</i>	Mid-Term Exam					
<i>Week-9</i>	Deadlocks	4	2	-	2	a4, b1, b2, b4,
<i>Week-10</i>	Protection and security	4	2	-	2	a2, b1, b2, b3
<i>Week-11</i>	Memory management	4	2	-	2	a3, a4, b4, c1
<i>Week-12</i>	Virtual memory	4	2	-	2	a3, a4, b4, b5, c1, c3
<i>Week-13</i>	File-System Interface	4	2	-	2	a3, a4, b4, b5, c1, c3
<i>Week-14</i>	LAB AND ORAL EXAM	4	2	-	2	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√		√	√	√			√				√	

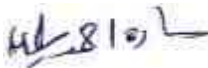
7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	9	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10 %
6	Final Oral Exam		0	
7	Assignments / Project	weekly	10	10 %
8	Field training		0	
9	Other (Mention)		0	



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Abraham. S, Greg.G, and Peter.G, “Operating System Concepts”, 10 th edition, Wiley & Sons, Inc. 2019.
	Other References	William Stallings, "Operating system Internal and design principles", 7 th edition, Pearson Education Inc, 2011.
	Electronic Sources (Links must be added)	https://www.tutorialspoint.com/operating_system/index.htm
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Sara Ahmed	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 441

Course Name: Real Time Systems

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level4		
Term/ Academic year	Oct.	2025/2026			Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 306							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Rania Ragab Hussien					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course presents, introduction to real time systems ; Typical real time applications ; Hard versus soft real time systems ; A reference model of real time systems ; Commonly used approaches to hard real time scheduling ; Clock-driven scheduling ; Priority-driven scheduling of periodic tasks ; Scheduling periodic and Sporadic tasks ; Resources and resource access control ; Multiprocessor scheduling and resource access control ; Scheduling flexible computations and tasks with temporal distance constraints ; Real time communications ; Real time operating system ; Real time programming languages.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:



- a.1. Understand the principles of real-time systems, their scheduling, and resource management.
- a.2. Knowledge of different scheduling algorithms like clock-driven, priority-driven, and multiprocessor scheduling.
- a.3. Understand how real-time operating systems and communications integrate into real-time system design.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Ability to analyze the scheduling techniques and algorithms in real-time systems.
- b.2. Critical thinking applied to system performance and resource access control.
- b.3. Problem-solving applied to flexible computations and multiprocessor scheduling.

.....

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Design and implement scheduling mechanisms in real-time systems.
- c.2. Apply multiprocessor scheduling and task management strategies in real-time environments.
- c.3. Manage real-time communications and operating systems effectively.

.....

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Effective teamwork in system design and problem-solving.
- d.2. Clear communication of complex technical concepts.
- d.3. Adaptability to evolving real-time system technologies and methodologies.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A8	Management and economics principles relevant to computing and information disciplines.	a1
A9	Professional, moral, and ethical issues involved in the exploitation of computer technology and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.	a2
A10	Current developments in computing and information research.	a3
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.	b1
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b3
B7	Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact.	b2
C4	Apply computing information retrieval skills in computing community environment and industry.	c3
C6	Design, implement, maintain, and manage software systems.	c1
C8	Handle a mass of diverse data, assess risk and draw conclusions.	c2
D3	Show the use of information-retrieval.	d1
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d2
D8	Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.	d3



Higher Technological Institute (HTI)-10th of Ramadan City
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Course Specification

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Introduction to Real-Time Systems	4	2	-	2	a1, a2, b1, c1, d1
Week-2	Typical Real-Time Applications	4	2	-	2	a3, b2, c2, d2
Week-3	Hard vs. Soft Real-Time Systems	4	2	-	2	a1, b1, b3, c1, c3, d3
Week-4	A Reference Model of Real-Time Systems	4	2	-	2	a2, b2, c1, d1
Week5	Common Approaches to Hard RealTime Scheduling	4	2	-	2	a1, a2, b1, b2, c1, c2, d1
Week-6	Clock-Driven Scheduling	4	2	-	2	a1, b2, c1, d3
Week-7	Priority-Driven Scheduling of Periodic Tasks	4	2	-	2	a1, a2, b3, c1, d2
Week-8	Midterm Exam.					
Week-9	Scheduling Periodic and Sporadic Tasks	4	2	-	2	a1, b1, b3, c2, d3
Week-10	Resource and Resource Access Control	4	2	-	2	a2, a3, b3, c2, c3, d2
Week-11	Multiprocessor Scheduling and Resource Access Control	4	2	-	2	a2, a3, b3, c2, c3, d2
Week-12	Scheduling Flexible Computations and Tasks with Temporal Distance Constraints	4	2	-	2	a1, a3, b1, b3, c2, c3, d1, d3
Week-13	Real-Time Communications. Real-Time Operating Systems (RTOS).	4	2	-	2	a1, a2, a6, b1, b4, c1, c3, c5, d1, d2, d5
Week-14	LAB Exam					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓		✓	✓					

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	5	5%
2	Quiz 2 written (Semester work)	13	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10%	10%
6	Final Oral Exam	-	0	-
7	Assignments / Project	All Weeks	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	• Lecturer Notes (PDF file, Presentation, and Word documents). • Hermann Kopetz, Real-Time Systems: Design Principles for Distributed Embedded Applications, Springer, 2011. • Rajib Mall, Real-Time Systems: Theory and Practice, Pearson, 2008. • Alan Burns, Andy Wellings, Real-Time Systems and Programming Languages, AddisonWesley, 4th Edition, 2009. • Albert M. K. Cheng, Real-Time Systems: Scheduling, Analysis, and Verification, Wiley, 2002.
	Other References	None.
	Electronic Sources (Links must be added)	None.
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

Course Code: CS 343

Course Name: Digital Signal Processing

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 3		
Term/ Academic year	Oct.	2025/2026			Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 103							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Rania Ragab Hussien 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course covers fundamentals of signal and system analysis. Topics include what is a signal, signal representation, signal and systems, frequency, filtering, classification of signals, periodic and non-periodic signals, operations performed on dependent (amplitude scaling, addition, multiplication, differentiation, integration) and independent variables (time scaling, reflection, time shifting), elementary signals, time domain representations of linear time invariant systems (LTI), convolution, interconnections of LTI systems, discrete-time Fourier transform, continuous-time Fourier transform, Z-transform, analog filter design, Butterworth filter, Chebyshev filter, elliptic filter, digital filters, IIR and FIR filters.



3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a1. Know fundamental concepts, principles, and theories of digital signal processing to analyze, design, and implement various digital signal processing systems.
- a2. Demonstrate Principles of design including elements design, process and/or a system related to digital signal processing.
- a3. Explain concepts and theories of mathematics and sciences, appropriate to the digital signal processing

b. Intellectual skills:

On successful completion of the courses, students should be able to:

On successful completion of the courses, students should be able to:

- b1. Analyze digital signal processing problems, including noise reduction, filtering, sampling, and quantization, to identify the underlying computational challenges and requirements.
- b2. Apply advanced mathematical concepts (e.g., Fourier transforms, Z-transforms, convolution) to analyze and design digital signal processing systems.
- b3. Formulate clear and achievable objectives for addressing DSP problems, considering factors such as feasibility, impact, and resource constraint

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Apply critical thinking and problem-solving skills to identify and address challenges in DSP projects.
- c2. Utilize programming languages such as MATLAB, Python, or C++ to implement various digital signal processing algorithms, including filtering, modulation, demodulation, and spectral analysis.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Perform quantitative calculations, such as filtering, convolution, and Fourier transforms, using mathematical tools and software simulations to analyze and design digital signal processing systems.
- d2. Utilize computational resources effectively.



Higher Technological Institute (HTI)-10th of Ramadan City
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Course Specification

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a3
A12	Essential mathematics relevant to computer science.	a2
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1,b2
B10	Define traditional and nontraditional problems, set goals towards solving them, and. observes results.	b3
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c1,c2
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c2
D5	Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.	d1
D7	Show the use of general computing facilities.	d2



Higher Technological Institute (HTI)-10th of Ramadan City
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Course Specification

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			ILOs Covered by Course
			Lec.	Tut.	Lab.	
<i>Week -1</i>	Analog and digital signals, discretization	4	2	-	2	a1, a3,
<i>Week-2</i>	quantization and coding of signals	4	2	-	2	a2, a3, b1
<i>Week-3</i>	Z -transform: ROC and properties. Transform analysis of LTI systems:	4	2	-	2	a2, a3, b1, b2
<i>Week-4</i>	Basic IIR and FIR structures	4	2	-	2	a2, a3, b1, b2
<i>Week5</i>	Filter design techniques: filter specifications	4	2	-	2	b3, c1, c2, d1, d2
<i>Week-6</i>	Discrete Fourier Transform part I	4	2	-	2	b2, b3, c2,d1
<i>Week-7</i>	Discrete Fourier Transform part II	4	2	-	2	b2, b3, c2,d1
<i>Week-8</i>	Mid-Term exam					
<i>Week-9</i>	Filter design using Fourier method.	4	2	-	2	a2, a3, b1,b2, d1
<i>Week-10</i>	sampling of the Fourier transform	4	2	-	2	a2, a3, b1,b2, d2
<i>Week-11</i>	The DFT, circular convolution,	4	2	-	2	a2, a3, b1,b2
<i>Week-12</i>	linear convolution using DFT, FFT.	4	2	-	2	a2, a3, b1,b2, c1
<i>Week-13</i>	Spectral analysis using DFT.	4	2	-	2	a2, a3, b1,b2, c1,
<i>Week-14</i>	practical exam	4	2	-	2	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓			✓					

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	9	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	0
7	Assignments / Project	Weekly	10	10%
8	Field training	-	0	0%
9	Other (Mention)	-	0	0%



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Proakis, John G., and Dimitris G. Manolakis. Digital Signal Processing: Principles, Algorithms, and Applications. 5th ed. Pearson, 2022.
	Other References	• A. Oppenheim and R. Schaffer, Discrete - Time Signal Processing, Pearson, 3rd. Ed., 2010. • Introduction to digital signal processing and filter design, B. A. Sheno, 2006. • John R. Buck, Computer Explorations in Signals and Systems Using MATLAB, Prentice Hall, 2nd. Ed., 2002.
	Electronic Sources (Links must be added)	-IEEE Signal Processing Society: https://signalprocessingsociety.org/ -DSP Guide: https://www.dspguide.com/
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 300

Course Name: Selected Topics in computer science

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 3		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:		Lab.:	2	Total	4
Pre-Requisite								
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator								
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course is intended to cover trending topics not covered by the other courses specified herein. Its syllabus and prerequisite are to be specified by the course instructor and must get approval by both the department and institute councils.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1.....
- a.2.....
- a.3.....
- a.4.



b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1.....
- b.2.
- b.3.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1.
- c.2.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1.
- d.2.
- d.3.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1		a1,a2
A2		a1,a3
A3		
B1		b1,b2,b3
C1		c1,c3,c4



**Higher Technological Institute (HTI)-10th of Ramadan City
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Course Specification

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1						
Week-2						
Week-3						
Week-4						
Week5						
Week-6						
Week-7						
Week-8	Midterm Exam.					
Week-9						
Week-10						
Week-11						
Week-12						
Week-13						
Week-14						



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
V															

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)		5	5%
2	Quiz 2 written (Semester work)		5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam		10	10 %
6	Final Oral Exam		0	
7	Assignments / Project		10	10 %
8	Field training		0	
9	Other (Mention)		0	



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Lecturer Notes (PDF file, Presentation, and Word documents)
	Other References	
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name		Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

Course Code: CS 304

Course Name: Analysis of algorithms

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 3		
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 201							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr/Sarah Ahmed Soliman 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course covers the following topics: problem solving strategies, principles of algorithm design, metrics for evaluating designs, iterative and recursive algorithms, structured and object-oriented paradigms. Algorithms for sorting and selection, randomized techniques, search structures (heaps, balanced trees, hash tables), dynamic programming and greedy algorithms, amortized analysis and graph algorithms (breadth- and depth-first search, MSTs, shortest paths).

3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1 Define the basic properties of algorithms and methods for analyzing them.
- a.2 Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it.
- a.3 Using of high-level programming languages to implement different algorithms.
- a.4 List the major algorithms for sorting and the design strategies that the algorithms embody.
- a.5 Define the major graph algorithms and their analyses.



b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Explain the difference between computer algorithms and methodologies.
- b2. Summarize attributes and patterns of different computer algorithms.
- b3. Summarize the outcome of different algorithms and their results.
- b4. Set criteria for selecting algorithms and verify implementation impacts.
- b5. Explain traditional and nontraditional problems, apply algorithms towards solving them, and observe results.
- b6. Explain computer algorithms in terms of general attributes and possible tradeoffs presented within the given problem.

Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Apply comprehensive computing knowledge and skills in projects and in deployment of computers algorithms to solve position practical problems.
- c2. Analyze worst-case running times of algorithms using asymptotic analysis. Describe the relative merits of worst-, average-, and best-case analysis.
- c3. Analyze algorithms using asymptotic analysis, when appropriate. Recite analyses of simple algorithms that employ this method of analysis.
- c4. Design, and implement computer algorithms.
- c5. Analyze algorithms that employ sorting as a sub procedure. Derive lower bounds on the running time of comparison-sorting algorithms and explain how these bounds can be overcome.
- c6. Use new graph algorithms and algorithms that employ graph computations as key components.
- c7. Apply important algorithmic design paradigms and methods of analysis

c. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Demonstrating skills in group working, team management, time management and organizational skills development.
- d2. Demonstrate a familiarity with major algorithms and data structures.
- d3. Show the use of Shortest Path Algorithms.



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a2
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a4
A13	Using of high-level programming languages.	a3
A15	Interpreting and analyzing data qualitatively and/or quantitatively.	a1
A18	The fundamental topics in Computer Science, including hardware and software architectures, software engineering principles and methodologies, operating systems, compilers, parallel and distributed computing, systems, and software tools.	a1
B4	Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints.	b4
B7	Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact	b4,b6
B10	Define traditional and nontraditional problems, set goals towards solving them, and. observes results.	b5
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b3
B16	Establish criteria and verify solutions.	b4
B19	Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.	b4,b5
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c2, c4, c7
C4	Apply computing information retrieval skills in computing community environment and industry.	c1
C6	Design, implement, maintain, and manage software systems.	c1,c4,c7
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c2,c4,c6
C13	Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy.	c1
C14	Specify, design, and implement computer-based systems.	c1,c4,c7
C15	Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.	c3



C16	Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.	c1
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d1
D3	Show the use of information-retrieval.	d3
D8	Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.	d2

5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Introduction into Algorithms	4	2	0	2	a1,b1
Week-2	Asymptotic Analysis of algorithms.	4	2	0	2	a2,b1,b2
Week-3	Sorting Algorithms.	4	2	0	2	a3,a4,b3,b4,c4,c5,d2
Week-4	Solving Recurrences.	4	2	0	2	a2,b3,b5,b6,c1,c2
Week5	Search Algorithms	4	2	0	2	a3,b2,b3,b5,b6,c3
Week-6	Hashing Algorithms.	4	2	0	2	a3,b2,b3,b5,b6,c3
Week-7	Graph Algorithms.	4	2	0	2	A5,c6,d3
Week-8	Midterm Exam.					
Week-9	Design methods.	4	2	0	2	a2,a4,c1,c2,c7,d1
Week-10	Minimum Spanning Tree.	4	2	0	2	b3,b4,b5,c3
Week-11	Shortest Path Algorithms.	4	2	0	2	A5,b4,c2,c7,d3
Week-12	Dynamic Programming	4	2	0	2	a2,a3,b6
Week-13	Greedy Algorithm and Problem Complexity.	4	2	0	2	b2,b3,b4,b5,c1,c2,c5,d1
Week-14	Practical lab examination					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓			✓	✓			✓					

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	10	10 %
2	Quiz 2 written (Semester work)	-	0	-
3	Midterm exam	8	10	10 %
4	Final Written Exam	15&16	60	60 %
5	Final Practical Exam	14	10	10 %
6	Final Oral Exam	-	0	-
7	Assignments / Project	weekly	10	10 %
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Cormen, Leiserson, Rivest, Stein, "Introduction to Algorithms", 4th edition, MIT Press, 2021.
	Other References	
	Electronic Sources (Links must be added)	The Algorithm Visualization Portal: http://algoviz.org/
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr/Sarah Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

Course Code: CS 308

Course Name: Computer Graphics

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 3		
Term/ Academic year	Oct.	2025/2026			Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 310							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Rania Ragab Hussien					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course includes an introduction to the basic concepts, 2-D and 3-D modeling and transformations, viewing transformations, projections, rendering techniques, graphical software packages and graphics systems. Students will be expected to develop a graphics application in C in conjunction with a specially developed graphics library.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

CS 308 – Computer Graphics



- a1. Define fundamental concepts in computer graphics, including the differences between 2D and 3D graphics
- a2. Explain key terms such as pixels, vectors, and color models.
- a3. Describe the role of graphics systems and components in rendering and displaying visual information.
- a4. Understand viewing transformations to position and orient the camera in a 3D scene, including setting up camera views and projections.
- a5. Navigate graphics systems effectively to support the creation and manipulation of visual content.
- a6. Integrate theoretical knowledge of computer graphics with practical application development to create functional and visually accurate graphics applications.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Evaluate the performance of graphics algorithms and rendering processes within the application, identifying potential inefficiencies and optimizing code for better performance.
- b2. Modify 3D models using vertices, edges, and faces, and apply transformations such as translation, rotation, and scaling.
- b3. Present and document the development process, including design choices, implementation details, and testing results for the graphics application
- b4. Express 2D graphical objects using basic drawing primitives (e.g., lines, circles, polygons) and transformations.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Apply geometric transformations to 2D and 3D objects, including translation, rotation, and scaling.
- c2. Apply different projection techniques, such as orthographic and perspective projections, to transform 3D models into 2D images.
- c3. Use graphical software packages to create and edit 2D and 3D graphics, and understand the tools and functions provided by these packages.
- c4. Develop a graphics application using the C programming language in conjunction with a specially developed graphics library.
- c5. Apply optimization techniques to improve rendering speed and quality in the graphics application.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Implement basic rendering techniques to generate images from 3D models, including the use of shading and lighting models.
- d2. Implement key functionalities such as drawing, transformation, and rendering within the graphics application and troubleshoot and debug code to ensure proper operation.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

Program ILOs		Course ILOs
Code	Text	
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a1, a2, a3, a4, a5
A6	The current and underlying technologies that support computer processing and inter-computer communication.	a2, a3, a6
A11	Requirements, practical constraints, and computer-based systems.	a5, a6
A13	The principles and techniques of several application areas informed by the research directions of the subject, such as artificial intelligence, natural language processing, data mining, databases, and computer graphics.	a6
A16	The fundamental topics in Computer Science, including hardware and software architectures, software engineering principles and methodologies, operating systems, compilers, parallel and distributed computing, systems, and software tools.	a1, a3, a4
A19	Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing.	a6
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1, b2, b4
B7	Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact	b1, b3
B9	Evaluate research papers in a range of knowledge areas	b1, b3
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b2, b4
C6	Design, implement, maintain, and manage software systems.	c1, c2, c4
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c3, c4
C12	Prepare and present seminars to a professional standard.	c2, c3
C16	Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.	c3, c4
C17	Apply the principles of human-computer interaction to the evaluation and construction of a wide range of materials including user interfaces, web pages, and multimedia systems.	c2, c5



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1, d2
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	b3, d1

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			ILOs Covered by Course
			Lec.	Tut.	Lab.	
<i>Week -1</i>	Introduction to Computer Graphics	4	2	-	2	a1, a2
<i>Week-2</i>	Introduction to Computer Graphics	4	2	-	2	a1, a2
<i>Week-3</i>	2D Graphics and Modeling	4	2	-	2	a1, a2, b2, b4
<i>Week-4</i>	2D Graphics and Modeling	4	2	-	2	a1, a2, b2, b4
<i>Week5</i>	3D Graphics and Modeling	4	2	-	2	a1, a2, b2, b4
<i>Week-6</i>	3D Graphics and Modeling	4	2	-	2	a1, a2, a3, b2, b4
<i>Week-7</i>	Viewing and Projection	4	2	-	2	a3, a4, a5, a6, b1, b3, b4
<i>Week-8</i>	Midterm Exam.					
<i>Week-9</i>	Rendering Techniques	4	2	-	2	a3, a4, a5, a6, b1, b3, b4
<i>Week-10</i>	Rendering Techniques	4	2	-	2	a3, a4, a5, a6, b1, b3, b4
<i>Week-11</i>	Graphical Software Packages	4	2	-	2	c1, c2, c3, c4, c5, d1, d2
<i>Week-12</i>	Graphics Systems and Libraries	4	2	-	2	c1, c2, c3, c4, c5, d1, d2
<i>Week-13</i>	Development of Graphics Application	4	2	-	2	c1, c2, c3, c4, c5, d1, d2
<i>Week-14</i>	Lab exam					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓		✓	✓			✓		

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	8	5	5%
3	Midterm exam	7	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10 %
6	Final Oral Exam	-	0	0
7	Assignments / Project	weekly	10	10 %
8	Field training	-	0	0
9	Other (Mention)	-	0	0



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references , etc.) *	The main (essential) reference	- "Computer Graphics: Principles and Practice" Authors: John F. Hughes, Andries van Dam, Morgan McGuire, David Salomon, Kurt Akeley - "Real-Time Rendering" Authors: Tomas Akenine-Möller, Eric Haines, Naty Hoffman - "Interactive Computer Graphics: A Top-Down Approach with WebGL" Authors: Edward Angel, Dave Shreiner - "Fundamentals of Computer Graphics" Authors: Peter Shirley, Michael Ashikhmin, Steve Marschner - "Introduction to Computer Graphics and the Vulkan API" Author: Ray Tracing and Vulkan Programming by Ericson
	Other References	- "OpenGL Programming Guide: The Official Guide to Learning OpenGL" Authors: Dave Shreiner, Graham Sellers, John Kessenich, and Bill Licea-Kane - "OpenGL SuperBible: Comprehensive Tutorial and Reference" Authors: Graham Sellers, Richard S. Wright Jr., and Nicholas Haemel
	Electronic Sources (Links must be added)	Website: Khan Academy Website: TutorialsPoint Website: LearnOpenGL
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)



Higher Technological Institute (HTI)
Computer Science Department

Course Specification

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

Course Code: FT 301

Course Name: Field Training

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory			Academic level at which the course is taught	LEVEL 3		
Term/ Academic year	Choose an item.	2025/2026		Credit Hours:	0		
Contact Hours	Lecture:	18	Tutorial:		Lab.:		Total 18
Pre-Requisite	FT 201,30 credits completed.						
Academic standards			NARS 2010				
Bylaw Approval			2022				
Course Coordinator			Dr. Shaimaa Abdallah Ibraheem				
Course Specification Approval			Department Council				
Course Specification Approval Date			20/8/2025				

2. Course Overview:

Each Student must attend a supervised training program of 10 weeks in a relevant field to gain practical experience in a real engineering environment. At the end of the training period, the student must submit a written report for evaluation.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Describe the current and underlying technologies in the labor market that support computer processing and inter-computer communication.
- a.2. Recognize professional, moral and ethical issues involved in the computer technology labor market and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.
- a.3. List of the requirements, practical constraints and computer-based systems.



b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Analyze computing problems and provide solutions related to the design and construction of computing systems.
- b.2. Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.
- b.3. Identify attributes, components, relationships, patterns, main ideas, and errors.
- b.4. Summarize the proposed solutions of the training field and their results.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Implement comprehensive computing knowledge and skills in training field and in deployment of computers to solve position practical problems.
- c.2. Apply computing information retrieval skills in computing community environment and industry.
- c.3. Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.
- c.4. Prepare technical reports, and a dissertation, to a professional standard; use IT skills in the training field.
- c.5. Specify, design, and implement computer-based systems.
- c.6. Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.
- c.7. Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds and apply them in the training field.
- c.8. Apply the principles of human-computer interaction to the evaluation and construction of a wide range of materials including user interfaces, web pages, and multimedia systems.
- c.9. Apply and manage the need for continuing professional and practical development in recognition of the need for life long-learning

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Use IT skills and display mature computer literacy.
- d.2. Reveal communication skills, public speaking and presentation skills, and delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.
- d.3. Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A6	The current and underlying technologies that support computer processing and inter-computer communication	a1,
A9	Professional, moral, and ethical issues involved in the exploitation of computer technology and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.	a2
A11	Requirements, practical constraints, and computer-based systems.	a3
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.	b2
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b3
B15	Restrict solution methodologies upon their results.	B4
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c1
C4	Apply computing information retrieval skills in computing community environment and industry.	c2
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c3
C13	Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy.	c4
C14	Specify, design, and implement computer-based systems.	c5
C15	Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.	C6
C16	Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.	C7
C17	Apply the principles of human-computer interaction to the evaluation and construction of a wide range of materials including user interfaces, web pages, and multimedia systems.	C8
C18	Apply and manage the need for continuing professional and practical development in recognition of the need for life long-learning.	C9
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d1
D6	Reveal communication skills, public speaking and presentation skills, and delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.	d2



D8	Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.	d3

5- Course Schedule:

Training Fields:

- Networks (Administration, design, implementation, infrastructure)
- Networks and ICT.
- Developing (Desktop, Web, Mobile, embedded systems)
- AI (smart home, smart cities, IoT, modeling, medical field)
- Information Systems.
- Business Intelligence.
- Database and Data warehouse (design, administration)
- Data mining (market research, e-Business, other).
- General Applications.
- Graphical Systems and Applications
- Microprocessor Applications and Peripherals.
- Other Information technology related fields (required approval from supervisor).

Rules and Regulations:

- The student must perform Field Training for 120 hours in an industrial or service facility related to the student's program and must be under the full supervision of the department. It is also possible to perform the training inside the department in a similar environment.
- The training follow-up will be handled by the academic advisor assigned by the Program Steering Committee.
- Identifying a company official contact person.
- The student must submit a technical report to his/her academic advisor at the end of the training period.
- The company should submit a student's training evaluation form to the academic advisor at the end of the training period.
- Field Training is evaluated on Pass / Fail basis and does not count in the cumulative GPA calculation. Student should pass the Field Training to be graduated.



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Training Authority Report	Student Performance	-	-
2	Supervisor Report	Overall result	Pass / Fail	-
3	Training Authority Survey	For explanation	-	-
4	Student Survey	For explanation	-	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	
	Other References	
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Shaimaa Abdallah Ibraheem	Dr. Rania Ragab Hussien
Signature		



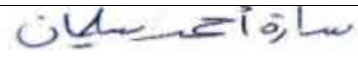
Higher Technological Institute (HTI)
Computer Science Department
Course Specification

Course Code: CS 310.

Course Name: Computer Networks.

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 3		
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:	2		
Contact Hours	Lecture:	2	Tutorial:		Lab.:	2	Total	4
Pre-Requisite	CS 101							
Academic standards				NARS 2010				
Bylaw Approval				2022				
Course Coordinator				Dr Sara Ahmed 				
Course Specification Approval				Department Council				
Course Specification Approval Date				20/8/2025				

2. Course Overview:

This course introduces the computer networks fundamentals with emphasis on higher level protocols and functions are considered. Course contents include network design considerations, software design and layering concepts, interface design, routing and congestion control algorithms, internetworking, transport protocol design, end-to-end communication, session and application protocols. Specific examples of commercial and international standards are cited.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1 Understand the core purposes and goals of computer networks and their applications.
- a.2 Define different network devices, protocols, and technologies required for inter- computer communication.
- a.3 Describe the principals of generating tests which investigate the functionality of computer networks and evaluating their results.
- a.4 Define the requirements, practical constraints, and computer-based systems in the lab of computer networks.



Higher Technological Institute (HTI)
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Course Specification

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1 Summarize the principles of network layers and their protocols.
- b.2 Explain to Perform comparisons between different protocols used in network layers.
- b.3 Suggest innovative ideas relevant to networks design, network protocols, and network security problems.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1 Analyze the network performance using Wireshark Commands, Shells, and Editors.
- c.2 Perform independent information acquisition and management, using scientific literature and Web sources.
- c.3 Design a simple computer network, recognizing its capabilities and limitations.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1 Demonstrate skills in group working, team management, time management and organizational skills.
- d.2 Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.
- d.3 Demonstrate the ability to Solve problems relevant to network using ideas and techniques.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications.	a1, a2
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a2, a3
A6	The current and underlying technologies that support computer processing and inter-computer communication.	a1, a2
A7	Principles of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a3
A11	Requirements, practical constraints, and computer-based systems.	a4
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b3
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b2
B14	Summarize the proposed solutions and their results.	b1
B19	Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.	b3



5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs.</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
<i>Week -1</i>	Fundamentals of computer networks	4	2	-	2	a1, a2,a3
<i>Week-2</i>	Software Design and Layering (OSI,TCP/IP)	4	2	-	2	a2,a3, b1,c3
<i>Week-3</i>	Application layer Protocols	4	2	-	2	a2, a4, b2, c1,d3
<i>Week-4</i>	Transport layer	4	2	-	2	a4, b3,c3,d3
<i>Week-5</i>	Network Layer	4	2	-	2	a4, c1, c2, d1
<i>Week-6</i>	Data Link Layer	4	2	-	2	a4, b3, c2, c3
<i>Week-7</i>	IPv4 addressing.	4	2	-	2	a2,a3,a4, b1,b2, b3, c1
<i>Week-8</i>	Midterm Exam.					
<i>Week-9</i>	Fixed subnetting	4	2	-	2	a4, b2, b3, c1, c2
<i>Week-10</i>	Variable length subnet mask (VLSM)	4	2	-	2	b2, b3, c3, d1, d2
<i>Week-11</i>	Route Summarization	4	2	-	2	b1, b2, b3, c2, d3
<i>Week-12</i>	Routing Algorithms (RIP & OSPF)	4	2	-	2	a4, b2, b3, c1, c2
<i>Week-13</i>	Commercial and International Standards • Network standards organizations (e.g., IEEE) • Common commercial networking standards (e.g., Ethernet, Wi-Fi)	4	2	-	2	a4, b3, c1, c2
<i>Week-14</i>	Practical Exam / Final Revision					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓			✓	✓		✓	✓					

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	11	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam		0	
7	Assignments / Project	Every Week	10	10%
8	Field training		0	
9	Other (Mention)		0	



8 -Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Behrouz A. Forouzan, "Data Communications and Networking with TCP/IP Protocol Suite", 6th edition McGraw-Hill, 2021
	Other References	Jim Kurose, Keith Ross, "Computer Networking: A Top-Down Approach", 8th Edition, Pearson, 2021 • James F. Kurose, Keith W. Ross, "Computer Networking a Top-Down Approach", Pearson, 8th edition, ISBN-13: 978-0-13-285620-1
	Electronic Sources (Links must be added)	https://www.networkcomputing.com
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	DR sara Ahmed	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 340

Course Name: Network security

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 3		
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	3	Tutorial:	-	Lab.:	2	Total	5
Pre-Requisite	CS 310							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Sarah Ahmed Soliman					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course covers the duties of cybersecurity analysts who are responsible for monitoring and detecting security incidents in information systems and networks, and for executing a proper response to such incidents. The course introduces tools and tactics to manage cybersecurity risks, identify various types of common threats, evaluate the organization's security, collect and analyze cybersecurity intelligence, and handle incidents as they occur. Ultimately, the course promotes a comprehensive approach to security aimed toward those on the front lines of defense.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:



- a.1. Define concepts, principles and theories relating to cybersecurity.
- a.2. Define the principles of generating security tests which investigate the functionality of computer systems and evaluating their results.
- a.3. Define the moral and ethical issues involved in the security of computer systems and be guided by the appropriate ethical and legal practices relevant to cybersecurity.
- a.4. Describe cybersecurity countermeasures.
- a.5. Select between different methods of securing data and networks.
- a.6. Recognize the significance of the Internet to cybercrime.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Explain the concepts, principles, theories, and practices behind cybersecurity as an academic discipline.
- b.2. Evaluate the results of security tests to investigate the functionality of computer systems.
- b.3. Explain legal, moral, and ethical issues relevant to cybersecurity.
- b.4. Recommend solutions to security problems associated with the transport of information via a computer network.
- b.5. Identify and explore options with regard to security methods used to identify and secure the required data.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Design, implement, maintain, and manage security measures.
- c.2. Assess the risk mitigation and safety aspects involved in cybersecurity for a computer system.
- c.3. Prepare a plan to solve security problems, perform experiments, then analyze, evaluate, and extract conclusions from the experimental results.
- c.4. Troubleshoot a network security problem.
- c.5. Implement classical security measures to computer network and data encryption techniques.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Demonstrating the ability to make use of a range of learning resources of cloud computing and to manage one's own learning.
- d.2. Show the use of different computer facility in cybersecurity.
- d.3. Demonstrate an appreciation of the need to continue cybersecurity development in recognition of the requirement for life-long learning



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1, a2
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a2
A9	Professional, moral, and ethical issues involved in the exploitation of computer technology and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.	a3
A11	Requirements, practical constraints, and computer-based systems.	a4 , a5
A17	Showing a critical understanding of the principles of artificial intelligence, image, and pattern recognition.	a1, a6
A19	Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing.	a5, a6
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1
B6	Evaluate the results of tests to investigate the functionality of computer systems.	b2
B8	Familiar with the professional, legal, moral, and ethical issues relevant to the computing industry.	b3
B17	Identify a range of solutions and critically evaluate and justify proposed design solutions.	b4, b5
B18	Solve computer science problems with pressing commercial or industrial constraints.	b4, b5
C6	Design, implement, maintain, and manage software systems.	c1
C7	Assess the implications, risks or safety aspects involved in the operation of	c2
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c5



C13	Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy.	c3c
C14	Specify, design, and implement computer-based systems.	c1 , c4
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1
D7	Show the use of general computing facilities.	d2
D8	Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.	d3

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
<i>Week -1</i>	Introduction to Cybersecurity	4	2	-	2	a1,a2
<i>Week-2</i>	Cyber warfare and types of Cyber-attacks	4	2	-	2	a2,a3, a5, b1
<i>Week-3</i>	Network Forensic	4	2	-	2	a1, a3, a6, b2
<i>Week-4</i>	Cybersecurity monitoring	4	2	-	2	b1, b2,b3,c2
<i>Week5</i>	Vulnerabilities	4	2	-	2	b1, b2,b3,c2, c5
<i>Week-6</i>	Data and privacy control	4	2	-	2	a2,a5, b4, c5, d2
<i>Week-7</i>	Security Information and Event Management (SIEM)	4	2	-	2	a2,a5, b4, c5, d2
<i>Week-8</i>	Midterm Exam					
<i>Week-9</i>	Indicators of Compromise (IOC)	4	2	-	2	a6, b2, b5
<i>Week-10</i>	Risk mitigation.	4	2	-	2	c2, c4, d1
<i>Week-11</i>	Cloud security	4	2	-	2	a5, a6, b4, c1, c3, c4, d1
<i>Week-12</i>	IoT security	4	2	-	2	a5, a6, b4, c1, c3, c4,d2
<i>Week-13</i>	Cybersecurity Countermeasures	4	2	-	2	a4, b3, b5, c4, d3
<i>Week-14</i>	LAB AND ORAL EXAM					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓			✓					

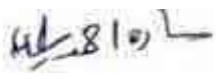
7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	10	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	0
7	Assignments / Project	6, 12	10	10%
8	Field training	-	0	0
9	Other (Mention)	-	0	0



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Elijah Lewis, " Cybersecurity: Advanced and Effective Measures to Secure Your Cyber Networks ", 1st edition, independently published, 2020
	Other References	Brent Chapman, Fernando Maymi, "CySA+ Cybersecurity Analyst", 2 edition, McGraw Hill, 2020.
	Electronic Sources (Links must be added)	None
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Sarah Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

Course Code: CS 443

Course Name: Pattern recognition

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 4		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 310							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Sara Ahmed Soliman 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course covers the methodologies, technologies, and algorithms of statistical pattern recognition from a variety of perspectives. Topics including Bayesian Decision Theory, Estimation Theory, Linear Discrimination Functions, Nonparametric Techniques, Support Vector Machines, Neural Networks, Decision Trees, and Clustering Algorithms etc. will be Presented

3. Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

a.1 Describe different concepts related to Pattern Recognition.

a.2 Describe fundamentals of Probability and Statistics

CS 442 - Data Communications



- a.3 Identify the bases of Bays classifier.
- a.4 Describe basic techniques of deep learning
- a.5 Explain machine learning algorithms , supervised and unsupervised techniques and classification methods

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Explain with the professional issues relevant to the pattern recognition.
- b2. Express an appropriate performance metric for evaluating AI algorithms/tools for a given pattern.
- b3. Express comparisons between supervised and unsupervised techniques.
- b4. Summarize different feature extraction models.
- b5. Verify solutions of pattern recognition problems.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Apply different techniques of feature extraction. techniques...etc).
- c2. Develop new algorithms for machine learning algorithms
- c3. Apply Parametric and non-parametric classifiers to images.
- c4. Implement supervised classification techniques.
- c5. Apply deep learning techniques.
- c6. Use MATLAB Image Processing and Neural Network Toolbox.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Demonstrating the ability to make use of a range of learning resources and to manage one's own learning.
- d2. Use IT skills and display mature computer literacy.
- d3. Show the use of general computing facilities.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a1, a2, a3, a4, a12, a13
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a6, a7, a8, a9, a10
A8	Management and economics principles relevant to computing and information disciplines.	a12, a13
A13	Using of high-level programming languages.	a3, a4
A17	Showing a critical understanding of the principles of artificial intelligence, image, and pattern recognition.	a9, a10
B8	Familiar with the professional, legal, moral, and ethical issues relevant to the computing industry.	b9, b10
B10	Define traditional and nontraditional problems, set goals towards solving them, and. observes results.	b1, b2, b3
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b3, b4
B16	Establish criteria and verify solutions.	b5, b6
B17	Identify a range of solutions and critically evaluate and justify proposed design solutions.	b7, b8, b9
C1	Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.	c1
C3	Deploy the equipment and tools used for the construction, maintenance, and documentation of computer applications.	c2, c3
C7	Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.	c4
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c2, c3
C12	Prepare and present seminars to a professional standard.	c1, c4
C16	Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.	c3, c4



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D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d2
D7	Show the use of general computing facilities.	d3

5- Course Schedule:

Week No.	Topic	Total Hrs.	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Introduction to Pattern Recognition	4	2	-	2	a1,a2,b1,d1
Week-2	Probability and Statistics Review	4	2	-	2	a1,a2,b1,d1,c1
Week-3	Bayes' theorem Statistical distributions	4	2	-	2	a3,b1,b2,b3,c2,d1,d3
Week-4	Feature Extraction and Selection	4	2	-	2	a3,b1,b2,b3,c2,d1,d3
Week5	Feature selection techniques	4	2	-	2	a3,b1,b2,b3,c3,d1,d3
Week-6	Statistical Pattern Recognition	4	2	-	2	a3,b1,b2,b3,c3,d1,d3
Week-7	Parametric and non-parametric classifiers	4	2	-	2	a3,b1,b2,b3,c3,d1,d3
Week-8	Midterm Exam					
Week-9	Maximum likelihood estimation					a5,b4,b5,b3,c4,d1,d3
Week-10	Supervised Learning Classification algorithms (e.g., k-NN, SVM, decision trees) Evaluation metrics (e.g.,accuracy, precision, recall)	4	2	-	2	a5,c4,d1,d3
Week-11	Deep Learning for Pattern recognition Neural networks basics Convolutional Neural Networks (CNNs)	4	2	-	2	a4,b4, c4,c6
Week-12	Recurrent Neural Networks (RNNs) Transfer learning	4	2	-	2	a4,b5,c5,c6,d3
Week-13	Pattern Recognition in Computer Vision Image processing fundamentals Histogram based Object detection and recognition Image segmentation	4	2	-	2	a5,b4,b3,c6,d3
Week-14	LAB AND ORAL EXAM					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓		✓	✓			✓		

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	10	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10 %
6	Final Oral Exam	-	0	0
7	Assignments / Project	weekly	10	10 %
8	Field training	-	0	0
9	Other (Mention)	-	0	0



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Pattern recognition: introduction, features, classifiers and principles" by J Beyerer, R Hagmanns, D Stadler - 2022
	Other References	" Better Deep Learning Train Faster, Reduce Overfitting, and Make Better Predictions" jason Brownlee,2018.
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Sara Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

Course Code: CS 445

Course Name: Cloud Computing

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 4		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 310							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Sara Ahmed Soliman					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course covers, introduction to distributed systems - overview of cloud computing, advantages – history – characteristics – service and deployment models– concepts of cloud computing services – such as Infrastructure as a Service (IaaS) – Platform as a Service (PaaS) and Software as a Service (SaaS) – Virtualization Concepts – Migration Approaches – Resource Management.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1 Define concepts, principles and theories relating to cloud computing.
- a.2 Define the extent to which a cloud computing system meets the criteria defined for its current use and future development.



- a.3 Define the current and underlying technologies that support cloud computing.
- a.4 Define management and economics principles relevant to cloud computing.
- a.5 Define professional, moral, and ethical issues involved in the exploitation of cloud computing.
- a.6 Identify and recognize a broad range of technologies used with AI.
- a.7 Select advanced topics to provide a deeper understanding of some aspects of AI such as cloud computing.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Explain the concepts, principles, theories and practices behind cloud computing as an academic discipline.
- b2. Evaluate alternative cloud computing platforms taking into account limitations, and quality constraints.
- b3. Set judgments considering cloud computing balanced costs, benefits, safety, quality, reliability, and environmental impact.
- b4. Explain legal, moral, and ethical issues relevant to the cloud computing industry.
- b5. Evaluate research papers in a range of cloud computing.
- b6. Compare cloud computing models.
- b7. Summarize the proposed solutions and their results.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Examine cloud computing and recognize its capabilities and limitations.
- c2. Implement comprehensive computing knowledge and skills in projects and in deployment of cloud computing to solve position practical problems.
- c3. Deploy the equipment and tools used for the construction, maintenance, and documentation of cloud computing.
- c4. Develop a range of fundamental research skills, through the use of online resources, technical repositories, and library-based material in the field of cloud computing.
- c5. Assess the safety aspects involved in the operation of computing equipment used in cloud computing.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Demonstrating the ability to make use of a range of learning resources of cloud computing and to manage one's own learning.
- d2. Show the use of different cloud platforms.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1, a6, a7
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development.	a2
A6	The current and underlying technologies that support computer processing and inter-computer communication.	a3
A8	Management and economics principles relevant to computing and information disciplines.	a4
A9	Professional, moral, and ethical issues involved in the exploitation of computer technology and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.	a5
A18	The fundamental topics in Computer Science, including hardware and software architectures, software engineering principles and methodologies, operating systems, compilers, parallel and distributed computing, systems, and software tools.	a6
A19	Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing.	a7
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1
B4	Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints.	b2
B7	Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact	b3
B8	Familiar with the professional, legal, moral, and ethical issues relevant to the computing industry.	b4
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b6
B16	Establish criteria and verify solutions.	b5, b7
C1	Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.	c1
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c1,c2



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C3	Deploy the equipment and tools used for the construction, maintenance, and documentation of computer applications.	c2, c3
C5	Develop a range of fundamental research skills, using online resources, technical repositories and library-based material	c4
C7	Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.	c5
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1
D7	Show the use of general computing facilities.	d2

5- Course Schedule:

Week No.	Topic	Total Hrs.	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Introduction to Distributed Systems	4	2	-	2	a1, a2
Week-2	Network Basics for Cloud Computing	4	2	-	2	a1, a2, a3
Week-3	Overview of Cloud Computing	4	2	-	2	a2, a4, b1
Week-4	Characteristics and Architecture of Cloud Computing	4	2	-	2	a2, a4, b1, b2
Week5	Cloud Service Models (IaaS, PaaS, SaaS)	4	2	-	2	a1, a2,a3, a4, a5, b1, b2,b6
Week-6	Cloud Deployment Models	4	2	-	2	a1, a2, a3, a4, a5, b1, b2, b6
Week-7	Centralized Storage vs. Distributed Storage	4	2	-	2	a1, a2, a3, a4, a5, b1, b2, b5
Week-8	Midterm Exam					
Week-9	Introduction to Virtualization Features Part One	4	2	-	2	a1, a2, a3, a4, a5, b1, b2, b3, b5, c1, d2
Week-10	Introduction to Virtualization Features Part Two	4	2	-	2	a1, a2, a3, a4, a5, b1, b2, b3, b5, c1, d2
Week-11	Virtual Machines (VMs) vs. Containers	4	2	-	2	a1, a2, a3, a4, a5, b1, b2,b3, b5, b6, c1,d2
Week-12	Cloud Computing Trends	4	2	-	2	a1, a2, a3, a4, a5, b1, b2, b3, b5, c1,c2, c3, c4,d2
Week-13	Cloud Computing Technologies	4	2	-	2	a1, a2, a3, a4, a5, b1, b2, b3, b5, c1,c2, c3, c5,d2
Week-14	LAB AND ORAL EXAM					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√		√	√	√		√	√			√		

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	10	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10 %
6	Final Oral Exam	-	0	0
7	Assignments / Project	weekly	10	10 %
8	Field training	-	0	0
9	Other (Mention)	-	0	0



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	SK Singh, "Cloud Computing", 1st edition, independently published, 2021
	Other References	- Ruparelia, "Cloud Computing", 1 st edition, MIT Press, 2021. - Surbhi Rastogi, "Cloud Computing Simplified", 1st edition, BPB Publications, 2021.
	Electronic Sources (Links must be added)	https://e.huawei.com/en/talent/outPage/#/sxzcourse/home?courseId=hlGnE9N7rB4f4wpbU1V9IqKMCic
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Sara Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 344

Course Name: Network operating systems

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 4		
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 310							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Sara Ahmed Soliman					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course introduces students to a broad range of Network Operating System (NOS) concepts, including installation and maintenance. The course focus is on Windows Server and Linux Network Operating System concepts include managing and maintaining physical and logical devices, access to resources, the server environment, managing users, computers, and groups; disaster recovery and maintenance. The course cover the following topics: Manage user and group accounts and related system files, Automate system administration tasks by scheduling jobs, maintain system time, system logging, manage printers and printing, fundamentals of internet protocols, basic network configuration, basic network troubleshooting, configure a DNS server to support local recognition of hostnames, configure a DNS server to support a local recognition of hostnames, configure a DHCP server, configure an http server to support web-based document access, configure an ftp server to support remote file access and update, configure the system for file sharing.



3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1 Define concepts, principles and theories relating to windows server system administration.
- a.2 Identify the current and underlying technologies that support domain controller communication.
- a.3 Define requirements, practical constraints of administration of windows server-based system.
- a.4 Recall economic sides of modern organizations when design and administrate windows-based network.
- a.5 Describe the principles of Active directory of windows server operating system.
- a.6 Recognize a detailed knowledge of the tools and techniques involved in windows-based networking services.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Realize the concepts, principles, theories, and practices behind windows-based system.
- b2. Explain the steps to design a group policy object.
- b3. Analyze, assess, and modify the performance of Server Virtualization with Hyper-V.
- b4. Evaluate and analyze requirements for a windows server installation and design a suitable system.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Operate a windows-based system, recognizing its capabilities and limitations.
- c.2. Troubleshoot a windows-based network problem.
- c.3. Implement an effective strategic plan to meet the networking and internetworking
- c.4. requirements of an organization.
- c.5. Communicate effectively with system administrators in terms of identification of network
- c.6. Types, operating systems, and data storage areas.
- c.7. Evaluate the technical performance of windows-based network.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Demonstrate skills in group working, team management, time management and organizational skills.
- d2. Show the use of windows-based system administrative tools.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1,a3,a5
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a6
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b2
C1	Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.	c1
C6	Design, implement, maintain, and manage software systems.	c3
C7	Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.	c2
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d1,d2



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Deploying and Managing Windows Server	4	2	-	2	a1, a3, b1, b4, b3
Week-2	Introduction to Active Directory Domain Services	4	2	-	2	a2, a3,a4, b3, b4, c1, c2
Week-3	Managing Active Directory Domain Services Objects	4	2	-	2	a5,a6,b1,b2, c1, c2
Week-4	Automating Active Directory Domain Services Administration	4	2	-	2	a5,a6,b1,b2, c1, c2
Week5	Implementing IPv4 / IPv6	4	2	-	2	a5,a6,b1,b2, b5, c1, c2
Week-6	Implementing DHCP / DNS	4	2	-	2	a5,a6,b1,b2, b5, c1, c2, c4
Week-7	Implementing Local Storage	4	2	-	2	a3, a6, b3, c4, c5
Week-8	Midterm Exam.					
Week-9	Implementing File and Print Services	4	2	-	2	a3, a6, b3, c4, c5
Week-10	Implementing Group Policy	4	2	-	2	a5, a6, b2, c3, c5, d1,d2
Week-11	Securing Windows Servers Using Group Policy Object	4	2	-	2	a5, a6, b2, c3, c5, d1,d2
Week-12	Implementing Server Virtualization with Hyper-V	4	2	-	2	a5, a6, b2,b3, b4, c3, c5, d1,d2
Week-13	Configuring Windows Firewall and IPsec	4	2	-	2	a5, a6, b2, b5, c2, c3, c5, d1,d2
Week-14	LAB AND ORAL EXAM	4	2	-	2	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√				√	√								

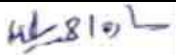
7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	10	10 %
2	Quiz 2 written (Semester work)	-	0	-
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	40	60 %
5	Final Practical Exam	14	10	10 %
6	Final Oral Exam	-	0	-
7	Assignments / Project	11	10	10 %
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Bekim Dauti, "Windows Server 2019 Administration Fundamentals", 2nd edition, Packt Publishing, 2019
	Other References	Crystal Panek, " Windows Server Administration Fundamentals", 2nd edition, Sybex, 2019
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Sara Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 345

Course Name: Wireless and Mobile Communication

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 4		
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	3	Tutorial:	-	Lab.:	2	Total	5
Pre-Requisite	CS 310							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Mona Mohamed					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course introduces the physical characteristics of wireless transmission systems and their practical applications (including topics such as 3G, 4G and 5G mobile wireless technologies, WiFi, Wi-Max, LTE, mobile ad-hoc networks and satellite networks). This course will build a basic understanding of designing and analysis of wireless and mobile communication systems.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a1. Understand the fundamental concepts of wireless transmission systems, including physical layer characteristics and spectrum usage.
- a2. Identify the current and underlying technologies that support cellular communication.



- a3. Explain the evolution of mobile communication technologies from 3G to 5G, including key features and differences.
- a4. Describe the principles of Ad-hoc networks.
- a5. Recognize a detailed knowledge of the tools and techniques involved mobile network.
- a6. Describe the principles of mobile networking technologies

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Realize the concepts, principles, theories, and practices behind 4G / 5G network.
- b2. Analyze the performance of wireless local area networks (Wi-Fi), WiMax, and LTE technologies, including their architecture and protocols.
- b3. Analyze and assess the performance of 5G network.
- b4. Evaluate wireless systems, considering factors such as path loss, capacity, coverage, and link budgets.
- b5. Analyze the performance of wireless local area networks (Wi-Fi), WiMax, and LTE technologies, including their architecture and protocols.
- b6. Analyze traffic flow in a mobile network to optimize performance.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Operate a mobile network, recognizing its capabilities and limitations.
- c2. Troubleshoot a mobile network problem.
- c3. Implement an effective strategic plan to meet the networking and internetworking requirements of an organization.
- c4. Evaluate the technical performance of mobile network.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Demonstrate skills in group working, team management, time management and organizational skills.
- d2. Show the use of mobile networks.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1,	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1, a2
A6	The current and underlying technologies that support computer processing and inter computer communication.	a2
A9	Professional, moral, and ethical issues involved in the exploitation of computer technology and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.	a3
A11	Requirements, practical constraints, and computer-based systems.	a4, a5
A14	Demonstrating basic knowledge and understanding of a core of analysis, algebra, applied mathematics and statistics.	a1, a6
A19	Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing.	a5, a6
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b2
B15	Restrict solution methodologies upon their results.	b3
B17	Identify a range of solutions and critically evaluate and justify proposed design solutions.	b4, b5
B19	Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.	b4, b5
C1	Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.	c1c
C13	Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy.	c2
C15	Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.	c5
C18	Apply and manage the need for continuing professional and practical development in recognition of the need for life long-learning.	c3



D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1
D7	Show the use of general computing facilities.	d2

5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Introduction to Wireless Transmission Systems - Basics of wireless communication - Characteristics of wireless channels	4	2	-	2	a1, b1
Week-2	Cellular Network Technologies - Overview of mobile generations: 3G, 4G, and 5G - Evolution of mobile communication systems	4	2	-	2	a2, a3, a6, b1, b3, b5, b6, c4
Week-3	Wireless Local Area Networks (WLANs) -Wi-Fi standards (802.11) -Medium access control in wireless systems	4	2	-	2	a5, a6, a2, b1, b4, b2, b5, d2
Week-4	Wireless LAN architecture and Performance analysis of WLANs	4	2	-	2	a5, a6, a2, b1, b4, b2, b5, d2
Week5	-Fundamentals of WiMax (802.16) -LTE architecture and design	4	2	-	2	a2, a4, b2, b5, b6, c2, c3, c4 ,
Week-6	Radio access technologies	4	2	-	2	a2, a4, b2, b5, b6, c2, c3, c4 ,
Week-7	LTE and LTE-Advanced features	4	2	-	2	a2, a4, b2, b5, b6, c2, c3, d2
Week-8	Midterm Exam					
Week-9	Mobile Ad-Hoc Networks (MANETs)	4	2	-	2	a2, a4, a5, b2, b5, b6, c1, c4 , d2
Week-10	Routing protocols in MANETs	4	2	-	2	a2, a4, a5, b2, b5, c1, c4 , d2
Week-11	Security issues in ad-hoc networks	4	2	-	2	a2, a4, a5, b2, b5, b6, c1, c2, c3
Week-12	Design and Analysis of Wireless Systems	4	2	-	2	b2, b3, b6, c1, c2, c3, c4 , d2
Week-13	Network planning and optimization	4	2	-	2	b2, b3, b4, b5, b6, c1, c2, c3, c4
Week-14	LAB AND ORAL EXAM					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓			✓					

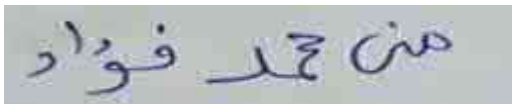
7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	10	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	0
7	Assignments / Project	6, 12	10	10%
8	Field training	-	0	0
9	Other (Mention)	-	0	0



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Dr.Prakash Kumar, " Cellular Networks ", 1st edition, BookRix, 2021
	Other References	• Paul Bedell, " Cellular Networks: Design and Operation ", Illustrated edition, Outskirts Press, 2014 • Emerging 5G Wireless Technologies: Overview, Evolution, and Applications" (2021)
	Electronic Sources (Links must be added)	IEEE Xplore Digital Library Coursera Wireless Communication Courses
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Mona Mohamed	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 425

Course Name: Neural Networks

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 4		
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 304							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Shaimaa Abdallah					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

The course introduces the theory and practice of neural computation. It offers the principles of neurocomputing with artificial neural networks widely used for addressing real-world problems such as classification, regression, pattern recognition, data mining, time-series prediction, etc... Knowledge and tools for the specification, design, and practical implementation of ANN are also provided.

3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a1. Define Single-layer Networks: capabilities, Perceptron learning algorithm, LMS learning algorithm, and least squares algorithms.
- a2. Define Multi-layer Networks: capabilities, back-propagation, generalization, radial basis



function networks, and recurrent networks.

a3. Describe Principal Component Analysis, Independent Component Analysis, kernel PCA, competitive learning algorithms, vector quantization, hybrid algorithms.

a4. Explain the concepts of network optimization techniques, including regularization methods, learning rate adaptation, and convergence criteria for effective training of neural networks.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Explain fundamental concepts and methodology of Neural Networks.
- b2. Explain the function of artificial neural networks of the backpropagation.
- b3. Explain the difference between supervised and unsupervised learning.
- b4. Give example of design and implementation for small problems.
- b5. Explain the technical potential and the advantages and limitations of the learning and Self-organizing systems of today
- b6. Explain both the advantages and limitations of solutions based on Neural Networks to people without deep technical knowledge.
- b7. Use comparative analysis, both theoretical and empirical, in order to decide which Neural Network is most suitable for a particular task.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Use scientific techniques such as Neural Networks to solve real world problems.
- c2. Create real world applications using Neural Networks techniques.
- c3. Apply integrating intelligent systems such as Neural Networks, pattern recognition, fuzzy logic to solve real world complex problems.
- c4. Apply algorithms to achieve signal processing, optimization, classification and process modeling.
- c5. Create different kinds of Neural Network on their own, evaluate their performance, and use them to solve complex problems.
- c6. Use comparative analysis, both theoretical and empirical, in order to decide which Neural Network is most suitable for a particular task.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Show Demonstrating skills in-group working, team management, time management and organizational skills.
- d2. Demonstrate IT skills and display mature computer literacy.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1,a2
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a4
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a3
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b2,b4
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1,b3,b6
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c1,c2,c3
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d1,d2



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Introduction to neural networks	4	2	0	2	a1, a2
Week-2	the basic structure of neural networks	4	2	0	2	a2, b1
Week-3	the basic structure of neural networks	4	2	0	2	b1, b2, b3, a4
Week-4	Practical issues in Neural networks training	4	2	0	2	a2, a3, b2
Week5	Optimization algorithms	4	2	0	2	a3, b2, b3,a4,c1,c2, c3,c4
Week-6	Common Neural Networks' Architectures	4	2	0	2	b2, b4,b5,c1 c2, c3,c4
Week-7	Revision	4	2	0	2	a1,a2,a3, b1,b2, b3, b4,c1, c2
Week-8	Midterm Exam.					
Week-9	Convolutional neural networks (CNN)	4	2	0	2	b2,b3,b5,b6, c4,c5,c6
Week-10	Recurrent Neural Networks (RNN)	4	2	0	2	b2,b3, b6, c4,c5,c6
Week-11	Advanced topic: Generative Adversarial Networks	4	2	0	2	b2,b3,b6,b7, c4,c5,c6
Week-12	Autoencoder: Basic concepts	4	2	0	2	b2,b3, c2, c3
Week-13	Quiz and revision	4	2	0	2	a3,b2,b3,c1,c3, d1,d2
Week-14	LAB AND ORAL EXAM	4	2	0	2	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√		√		√		√								

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	10	10 %
2	Quiz 2 written (Semester work)		0	
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	13	10	10 %
6	Final Oral Exam		0	
7	Assignments / Project	14	10	10 %
8	Field training		0	
9	Other (Mention)		0	



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	"Fundamentals of Artificial Neural Networks" by Mohamad Hassoun (2020).
	Other References	"Hands-On Neural Networks: Learn How to Build and Train Neural Network Models Using Python" by V Kishore Ayyadevara (2019). - "Neural Networks: A Comprehensive Foundation" (3rd Edition) by Simon Haykin (2019).
	Electronic Sources (Links must be added)	https://www.coursera.org/learn/neural-networks-deep-learning https://www.javatpoint.com/artificial-neural-network
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Shaimaa abdullah	Dr. Rania Ragab Hussien
Signature		



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

Course Code: CS 426

Course Name: Computer Animation

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 4		
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 308							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr.Shaimaa Abdallah 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course covers 3D modeling; rendering techniques; key framing; interpolations; hierarchical animation; camera animation; light animation; special effects; digital animation techniques; recording and production planning.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1 Define the principles and techniques of 3D modeling and rendering.
- a.2 Describe key framing and interpolation methods used in animation.
- a.3 Understand hierarchical and camera animation, including the impact of camera and light animation on visual storytelling.
- a.4 Discuss digital animation techniques and production planning for effective recording and



production.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Analyze and evaluate different 3D modeling and rendering techniques to solve animation Challenges.
- b2. Realize key framing and interpolation methods to create smooth, dynamic animations.
- b3. Clarify hierarchical, camera, and light animations to enhance visual storytelling and special Effects.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Develop and implement 3D models and rendering techniques using industry-standard Software tools.
- c2. apply key framing, interpolation, and hierarchical animation to produce high-quality Animated sequences.
- c3. Employ camera, light animations, and special effects to enhance multimedia projects.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Communicate complex animation concepts and techniques effectively to diverse audiences.
- d2. Work collaboratively and manage multiple tasks to efficiently plan and execute animation projects.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a1,a3
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a2
A15	Interpreting and analyzing data qualitatively and/or quantitatively.	a2
A18	The fundamental topics in Computer Science, including hardware and software architectures, software engineering principles and methodologies, operating systems, compilers, parallel and distributed computing, systems, and software tools.	a1,a3
B7	Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact	b1
B16	Establish criteria and verify solutions.	b1,b2
B19	Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.	b3
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c1,c2
C13	Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy.	c1
C16	Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.	c3
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d1,d2
D8	Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.	d2



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Course Specification

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			ILOs Covered by Course
			Lec.	Tut.	Lab.	
<i>Week -1</i>	Introduction to 3D Modeling.	3	2	-	2	a1,b1
<i>Week-2</i>	Rendering Techniques.	3	2	-	2	a1,a2,b1,b2
<i>Week-3</i>	Practical Rendering.	3	2	-	2	a1,a2,b1,c1 ,d1
<i>Week-4</i>	Key Framing and Interpolation.	3	2	-	2	a2,b3,b2, ,c2
<i>Week5</i>	Implementing Key Framing and Interpolation.	3	2	-	2	B2,c2,d1,d2
<i>Week-6</i>	Hierarchical Animation.	3	2	-	2	A3,a4,b3,c2
<i>Week-7</i>	Practical Hierarchical Animation.	3	2	-	2	C2,c3,d1,d2
<i>Week-8</i>	Midterm Exam					
<i>Week-9</i>	Camera Animation.	3	2	-	2	A3, b2,c1,c2,c3,d1
<i>Week-10</i>	Light Animation.	3	2	-	2	A4, b2,c1,c2,c3,d1
<i>Week-11</i>	Special Effects.	3	2	-	2	A4,b3,c2,c3,d1
<i>Week-12</i>	Digital Animation Techniques.	3	2	-	2	A4,b3,c2,c3,d1,d2
<i>Week-13</i>	Recording and Production Planning.	3	2	-	2	A4,b3,c2,c3,d1,d2
<i>Week-14</i>	LAB AND ORAL EXAM					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓				✓	✓		✓	✓					

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	9	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	-
7	Assignments / Project	Weekly	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	"Digital Lighting and Rendering", Jeremy Birn, 3rd Edition, 2020
	Other References	"3D Math for 3D Graphics and Game Development", Eric Lengyel, 2nd Edition, 2015
	Electronic Sources (Links must be added)	Journal of Multimedia: http://www.academypublisher.com/jmm/
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr.Shaimaa Abdallah	Dr. Rania Ragab Hussien
Signature		



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Course Specification

Course Code: CS 430

Course Name: Data Mining

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 4		
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 304							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Sara Ahmed Soliman					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course gives algorithms and computational paradigms that allow computers to find patterns and regularities in databases, perform prediction and forecasting, and generally improve their performance through interaction with data. Knowledge Discovery that deals with extracting useful knowledge from raw data. The knowledge discovery process includes data selection, cleaning, coding, using different statistical and machine learning techniques, and visualization of the generated structures. Machine Learning methods as they provide the real knowledge discovery tools. Important related technologies, as data warehousing and on-line analytical processing (OLAP) will be also discussed.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:



- a.1 Define Modeling and design of data mining.
- a.2 Describe data warehouse.
- a.3 Describe the principles and techniques of data mining.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Evaluate alternative data mining technique considering limitations, and quality constraints.
- b.2. Perform comparisons between different types of data mining.
- b.3. Select the suitable tools, methods, and techniques for pattern mining, establishing criteria, and verify solutions.
- b.4. Identify a range of classification methods and critically evaluate and justify proposed design solutions.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Justify methodological for a data mining project for a given data type.
- c.2. Apply the principles of effective data mining to text, graph, and web.
- c.3. Analyze and documenting the feasibility of various data mining methods and comparing solution options.
- c.4. Maintaining existing data mining method.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Show the use of information-retrieval using data mining.
- d2. Exhibit appropriate numeracy skills in understanding and presenting data involving a quantitative dimension.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a1,a2,a3
A13	Using of high-level programming languages.	a3
A14	Demonstrating basic knowledge and understanding of a core of analysis, algebra, applied mathematics and statistics.	a3
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b2
B14	Summarize the proposed solutions and their results.	b3
B15	Restrict solution methodologies upon their results.	b1,b3



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B17	Identify a range of solutions and critically evaluate and justify proposed design solutions.	b1,b4
C11	Perform independent information acquisition and management, using scientific literature and Web sources.	c2
C15	Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.	c1,c3
C18	Apply and manage the need for continuing professional and practical development in recognition of the need for life long-learning.	c4
D3	Show the use of information-retrieval.	d1
D5	Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.	d2

5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Introduction to data mining	4	2	-	2	a1,b1,b2
Week-2	Data warehouse	4	2	-	2	a2,b3
Week-3	Data preprocessing	4	2	-	2	a3,b3,c1,c2
Week-4	Online analytical processing	4	2	-	2	a3,b3,c3,d2
Week5	Pattern mining; concepts and methods	4	2	-	2	a3,b3,c2,d1
Week-6	Classifications; basic concepts.	4	2	-	2	a3,b4,c4
Week-7	Advanced methods for classification	4	2	-	2	a3,b4,c4,d1,d2
Week-8	Midterm Exam					
Week-9	Cluster analysis	4	2	-	2	a3,b3,c1,c4
Week-10	Advanced methods for Cluster analysis	4	2	-	2	a3,b3,c1,c4,d1,d2
Week-11	Outlier detection	4	2	-	2	b3,b4,c4,d2
Week-12	Mining data stream.	4	2	-	2	b3,b4,c2,c4,d2
Week-13	Mining text, graph, and web data.	4	2	-	2	c2,c3,c4,d1,d2
Week-14	LAB AND ORAL EXAM	4	2	-	2	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓				✓								

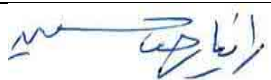
7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	9	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	-
7	Assignments / Project	Weekly	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Jiawei Han, Jian Pei, Hanghang Tong, " Data Mining: Concepts and Techniques ", 4th edition, Morgan Kaufmann, 2021.
	Other References	None
	Electronic Sources (Links must be added)	None
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Sara Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 431

Course Name: Web information system

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 4		
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 302							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr.Shaimaa Abdallah 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course will provide design and development of Web-based systems. It includes Internet and Web technology; Web development using design procedures, HTML, and XML; and hands-on experience in website design and authoring. The course will provide students with real world experience in the field of web information systems. Students will become acquainted with the workplace while enhancing their professional skills and interacting with other web information systems professionals.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1 Define concepts of web developing.
- a.2 Recognize modeling and design of web-based system bearing in mind the trade-offs.



- a.3 Define tools, practices and methodologies used in developing web system.
- a.4 Describe the principals of generating tests which investigate the functionality of web site and evaluating their results.
- a.5 Recognize current development in web developing.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Analyze web-based system problems and provide solutions related to the design and Construction of web system
- b.2. Recommend new ideas and designs using rational and reasoned arguments for presentation of web system
- b.3. Evaluate the results of tests to investigate the functionality of web a system.
- b.4.** Identify judgments considering balanced costs, benefits of web system.
- b.5. Express legal, moral, and ethical issues relevant to web system.
- b.6. Distinguish attributes, components, relationships, patterns, main ideas, and error related to web system.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Deploy the tools used for the building, maintenance, and documentation of web system
- c.2. Develop, Design, implement, maintain, and manage web system.
- c.3. Assess the implications, risks or safety aspects involved in the operation of web system.
- c.4. Use appropriate programming languages and database system when developing web system.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Demonstrating the ability to make use of a range of learning resources and to manage one's own learning in web developing.
- d.2. Show the use of general computing facilities when developing web system.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a2
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a3
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a4
A10	Current developments in computing and information research.	a5
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b2
B6	Evaluate the results of tests to investigate the functionality of computer systems.	b3
B7	Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact	b4
B8	Familiar with the professional, legal, moral, and ethical issues relevant to the computing industry.	b5
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b6
C3	Deploy the equipment and tools used for the construction, maintenance, and documentation of computer applications.	c1
C6	Design, implement, maintain, and manage software systems.	c2
C7	Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.	c3
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c4



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D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1
D7	Show the use of general computing facilities.	d2

5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Introduction to HTML and Web Pages	3	2	-	2	a1,a2,a3
Week-2	Images, Tables, Background and Forms	3	2	-	2	a3,a4, a5
Week-3	Cascading Style Sheets and Color Scheme	3	2	-	2	a3,a4, a5
Week-4	Cascading Style Sheets – Block Level	3	2	-	2	a3,a4, a5,b1,b2
Week5	Introduction to JavaScript	3	2	-	2	a3,a4,a5,b1,b2,b3,c1
Week-6	Processing HTML Forms	3	2	-	2	a3,a4,b1,b2, b3,c1,c2
Week-7	Conditions and Math Objects	3	2	-	2	B4,b5,b6,c3
Week-8	Midterm Exam					
Week-9	Loops, Arrays, Return Functions, Time Object, and Image Roller	3	2	-	2	a4,a5,b5,c3,c4,c5
Week-10	Introduction to PHP: Hypertext Preprocessor	3	2	-	2	a4,a5,b5,b6,c3,c4,c5
Week-11	Validating Forms and Loops	3	2	-	2	c2,c3
Week-12	Accessing Relational Database using MySQL and Working with Database Result Sets	3	2	-	2	c3,c4,c5,d1
Week-13	Interactive Pages: Searching and Updates with forms. Authentication: Working with Logins and Sessions	3	2	-	2	c2,c3,c4,c5 ,d1,d2
Week-14	LAB AND ORAL EXAM					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓				✓	✓	✓		✓					✓	

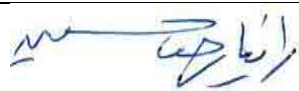
7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	9	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	-
7	Assignments / Project	Weekly	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Learning PHP,MY SQL&JAVASCRIPT with jQuery ,css &HTML5: 2021,SIX edition,Kindle edition .
	Other References	None.
	Electronic Sources (Links must be added)	Online learning tutorials: https://www.w3schools.com
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr.Shaimaa Abdallah	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

Course Code: CS 432

Course Name: XML Databases

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	level 4		
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 204							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr.Shaimaa Abdallah 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course will explore the current literature on XML databases and related technologies. The course will discuss current solutions to such issues as storage, indexing and query processing, and identify potential research areas. This course will also introduce topics such as XSLT, XPath, XML Schema, and XML.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1 Demonstrate knowledge of the structure and function of XML databases and related technologies.
- a.2 Understand the key challenges and solutions related to XML storage, indexing, and query



processing.

a.3 Recognize and describe the roles of XSLT, XPath, XML Schema, and XML DOM in XML data manipulation and processing.

a.4 Identify emerging research areas within the field of XML databases and related technologies.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

b1. Analyze XML database solutions to evaluate their approaches to storage, indexing, and query processing.

b2. Critically assess research literature to identify gaps and propose potential research areas in XML technologies.

b3. Formulate problem-solving strategies to optimize the use of XSLT, XPath, XML Schema, and XML DOM .

b4. Evaluate the performance of XML query processing techniques and suggest improvements.

b5. Synthesize knowledge from various XML-related technologies to design efficient database systems.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

c1. Design and implement XML databases with optimized storage, indexing, and query processing techniques.

c2. Develop and apply solutions using XSLT, XPath, XML Schema, and XML DOM for efficient XML data handling.

c3. Evaluate and optimize XML database performance through practical experimentation and analysis.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

d1. Communicate complex XML database concepts and solutions effectively through written Reports and presentations.

d2. Collaborate and manage time efficiently in team-based projects to solve challenges related To XML databases and technologies



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1,a2
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a1,a3
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a2,a3
A10	Current developments in computing and information research.	a4
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1,b4,b5
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b3,b5
B7	Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact	b4,b5
B8	Familiar with the professional, legal, moral, and ethical issues relevant to the computing industry.	b2
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b3,b5
C3	Deploy the equipment and tools used for the construction, maintenance, and documentation of computer applications.	c2
C6	Design, implement, maintain, and manage software systems.	c1,c3
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c1,c2,c3
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1
D7	Show the use of general computing facilities.	d2



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5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			ILOs Covered by Course
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
<i>Week -1</i>	Introduction to XML Databases	3	2	-	2	a1,a2
<i>Week-2</i>	XML Database Architecture and Models	3	2	-	2	a1,a2
<i>Week-3</i>	Storage Solutions in XML Databases	3	2	-	2	A2,a3, b1, b3
<i>Week-4</i>	Indexing Techniques for XML Databases	3	2	-	2	a1, b1,b2 ,c1,c2
<i>Week5</i>	Query Processing in XML Databases	3	2	-	2	a1, b1, b3,b4,b5,c1,c2,c3
<i>Week-6</i>	Hands-on: Query Optimization	3	2	-	2	a1,b2,b3, c2,c3
<i>Week-7</i>	Introduction to XSLT	3	2	-	2	a3, ,b3, c2
<i>Week-8</i>	Midterm Exam					
<i>Week-9</i>	Introduction to XPath	3	2	-	2	a3, ,b3, c2
<i>Week-10</i>	XML Schema Design and Validation	3	2	-	2	a4, b4, b5, c1, c2,c3, d1
<i>Week-11</i>	XML DOM and its Applications	3	2	-	2	a4, b4, b5, c1, c2,c3, d1
<i>Week-12</i>	Emerging Research Areas in XML Databases.	3	2	-	2	a4, b4, b5, c1, c2,c3, d1,d2
<i>Week-13</i>	Project Presentations and Course Review	3	2	-	2	c1, c2,c3, d1,d2
<i>Week-14</i>	LAB AND ORAL EXAM					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓								

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	9	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	-
7	Assignments / Project	Weekly	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Beginning XML", Joe Fawcett, Danny Ayers, Liam R. E. O'Connor, Wiley, 2020 (Fourth Edition)
	Other References	"XML Databases and the XML Query Language", Michael Rys, Erhard Rahm, Springer, 2021 (Second Edition)
	Electronic Sources (Links must be added)	IEEE Transactions on Knowledge and Data Engineering (TKDE) IEEE TKDE
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr.Shaimaa Abdallah	Dr. Rania Ragab Hussien
Signature		



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

Course Code: CS 433

Course Name: E-commerce

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 4		
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 302							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Rania Ragab Hussien 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

In this course, the student will examine the history of the Internet and its influence on E-Commerce; the validity of E-Commerce, and why it is increasingly being integrated into the business model. You will also explore the fundamental business concepts as they relate to E-Commerce, such as customer relationship management; e-procurement; security and staffing issues; planning; metric identification techniques for measuring the success of E-Commerce initiatives; marketing strategies on the World Wide Web; and information on E-Commerce software, hardware, and service providers.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a1. Define and discuss major concepts, tools, techniques, and methods of electronic commerce, with



a focus on the web.

- a2. Demonstrate recognition of key factors that influence the e-commerce market.
- a3. Describe the relationship between visual communication and e-commerce.
- a4. Demonstrate an understanding of business principles related to e-commerce.
- a5. Discuss and demonstrate an understanding of the major technologies (Data Mining- KDD) and applications at use in e-commerce.
- a6. Understand how payment systems work on the Internet
- a7. Discuss and demonstrate an understanding of the major database management systems (Data warehouse) at use in e-commerce.
- a8. Describe, compare, and contrast competing technologies and applications.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Describe the different capabilities of the Internet and how each one can be used to redesign retail practices. The technology revolution has provided retailers with tremendous opportunities for increasing the efficiency and effectiveness of doing business. The class will introduce the student to the many ways in which basic retailing functions can be enhanced through effective use of information technology and the Internet.
- b2. Describe how the Internet works, what it can and cannot do well, retail site security, etc.
- b3. Understand the social impact of e-commerce retailing
- b4. Understand basic e-commerce definitions and terminology
- b5. Be aware of the Internet history and the physical components making up the Internet
- b6. Describe the basic technological components required for implementing e-commerce and e-government initiatives
- b7. Create a simple website that includes dynamically generated web pages and simple forms for capturing data
- b8. Understand and have been exposed to basic usability strategies and web site evaluation metrics.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Learn the fundamental technologies behind Java-based e-commerce Web applications.
- c2. Apply your retail business and Internet skills by developing a personal e-commerce business.
- c3. Plan, design, and prototype a significant e-commerce web project.
- c4. practice good design, based on the Sun e-commerce Application Blueprint
- c5. build an e-commerce application with Java Web-based technology
- c6. partition an application to separate the concerns of presentation, logic, and data
- c7. Completely decouple the presentation layer with JSP templates.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Examine the aspects of E-commerce. Topics include internet development, EDS, security, network connectivity and privacy. Basic business practices using electronic commerce will also be covered.



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d2. Describe tools, skills, business concepts, and social issues that surround the emergence of electronic commerce.

d3. Develop an understanding of the current practices and opportunities in EDI, electronic publishing,

electronic shopping, electronic distribution, and electronic collaboration and database issues.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a1,a2
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a1,a3
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development.	a5,a7,a8
A6	The current and underlying technologies that support computer processing and inter-computer communication.	a6,a7
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a8
A8	Management and economics principles relevant to computing and information disciplines.	a4
A17	Showing a critical understanding of the principles of artificial intelligence, image, and pattern recognition.	a5
A19	Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing.	a8
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1,b7
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b4,b5,b6
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.	b2,b3



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B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b1,b7
B10	Define traditional and nontraditional problems, set goals towards solving them, and. observes results.	b6,b7
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b8
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b2,b3,b8
B15	Restrict solution methodologies upon their results.	b7,b8
C4	Apply computing information retrieval skills in computing community environment and industry.	c2
C6	Design, implement, maintain, and manage software systems.	c1,c3,c5,c6
C8	Handle a mass of diverse data, assess risk and draw conclusions.	c6,c7
C11	Perform independent information acquisition and management, using scientific literature and Web sources.	c2,c3
C12	Prepare and present seminars to a professional standard.	c3,c4
C13	Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy.	c2,c5
C14	Specify, design, and implement computer-based systems.	c3,c5
D3	Show the use of information-retrieval.	d1,d3
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d1,d2
D8	Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.	d2,d3



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5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs.			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Overview of Electronic Commerce	4	2	0	2	a1, a2, b1, c1, d1
Week-2	E-Marketplaces: Structures, Mechanisms, Economics, and Impacts Launching a Successful Online Business and EC Projects	4	2	0	2	a3, b2, c2, d2
Week-3	Amazon.com, Kazaa, and Types of eCommerce	4	2	0	2	a1, b1, b3, c1, c3, d3
Week-4	Building E-commerce Applications and Infrastructure	4	2	0	2	a2, b2, c1, d1
Week5	Building an e-Commerce website	4	2	0	2	a1, a2, b1, b2, c1, c2, d1
Week-6	Retailing in Electronic Commerce: Products and Services Consumer Behavior, Market Research, and Advertisement	4	2	0	2	a1, b2, c1, d3
Week-7	B2B E-Commerce: Selling and Buying in Private E-Markets	4	2	0	2	a1, a2, b3, c1, d2
Week-8	Midterm Exam.					
Week-9	Mobile Computing and Commerce and Pervasive Computing	4	2	0	2	a1, b1, b3, c2, d3
Week-10	Security and Encryption in web development and commerce	4	2	0	2	a2, b2, b3, c2, c3, d2
Week-11	Electronic Payment Systems	4	2	0	2	a2, a3, b3, c2, c3, d2
Week-12	Dynamic Trading: E-Auctions, Bartering, and Negotiations	4	2	0	2	a1, a3, b1, b3, c2, c3, d1, d3
Week-13	Social Networks and Industry Disruption in the Web 2.0 Environment	4	2	0	2	a1, a2, a6, b1, b4, c1, c5, d2
Week-14	Lab Examination	4	2	0	2	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓		✓	✓					

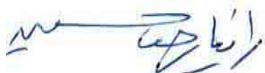
7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	9	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	-
7	Assignments / Project	Weekly	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	"Digital Marketing for Dummies" by Ryan Deiss and Russ Henneberry
	Other References	None
	Electronic Sources (Links must be added)	Harvard Business Review (HBR) Forrester Research
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 434

**Course Name: Geographical Information
Systems**

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 4		
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 204							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Mona Mohamed Fouad 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

The objective of this course is to learn how to treat geographical data, the connection between the geographical and the attributed data the difference types of data acquisitions techniques as photogrammetry, GPS, remote sensing etc. At the end of this course students should be able to see also the quality control of the geometric data and the different methods of its presentation.

3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

CS 434 - Geographical Information
Systems



- a1. Explain the fundamental concepts of geographical data and its components (spatial and attribute data).
- a2. Describe the relationship between geographical and attribute data.
- a3. Explain the principles, applications, and limitations of each data acquisition technique.
- a4. Identify the sources of errors in geographical data and understand their impact on data quality.
- a5. Describe various methods for assessing and ensuring the quality of geometric data.
- a6. Understand the importance of metadata in documenting data quality and characteristics.
- a7. Recognize different methods of geographical data presentation.
- a8. Explain the process of data integration from multiple sources and its challenges.
- a9. Discuss emerging trends and technologies in geographical data acquisition and processing.
- a10. Understand the legal and ethical considerations in collecting, processing, and presenting geographical data.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Analyze the relationship between geographical and attribute data.
- b2. Critically assess and compare different data acquisition techniques.
- b3. Synthesize information from multiple data sources.
- b4. Apply logical reasoning to solve geospatial problems.
- b5. Critically evaluate the quality of geometric data.
- b6. Evaluate and select appropriate data presentation methods.
- b7. Critically analyze emerging trends and technologies

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Operate various data acquisition tools and equipment, conduct field surveys, and collect geographical data using appropriate techniques
- c2. Implement methods to link geographical and attribute data effectively, and develop and maintain spatial databases, including proper organization of vector and raster data
- c3. Apply quality control procedures to assess the accuracy and reliability of geometric data, and conduct error detection and correction in spatial and attribute data.
- c4. Perform various spatial analysis techniques (e.g., overlay analysis, proximity analysis, network analysis) and apply geostatistical methods for interpolation and prediction.
- c5. Create effective thematic maps using appropriate symbolization and classification methods.
- c6. Design and produce both static and interactive maps for various purposes and audiences.
- c7. Utilize industry-standard GIS software (e.g., ArcGIS, QGIS) for data management, analysis, and visualization.
- c8. Emerging Technologies UAVs (drones) for aerial data collection and integrate the data into GIS workflows and machine learning.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Work effectively in multidisciplinary teams on geospatial projects.



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- d2. Analyze complex geospatial problems and develop effective solutions.
- d3. Adapt to new software tools and technologies in the rapidly evolving field of geospatial science.
- d4. Show the use of general computing facilities.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1,a2
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a1,a3
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a4, a5, a6
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a8, a9
A6	The current and underlying technologies that support computer processing and inter-computer communication.	a7, a8, a9
A10	Current developments in computing and information research.	a9, a10
A13	Using of high-level programming languages.	a2, a3
A15	Interpreting and analyzing data qualitatively and/or quantitatively.	a4, a5
A16	The principles and techniques of several application areas informed by the research directions of the subject, such as artificial intelligence, natural language processing, data mining, databases, and computer graphics.	a7, a9
A18	The fundamental topics in Computer Science, including hardware and software architectures, software engineering principles and methodologies, operating systems, compilers, parallel and distributed computing, systems, and software tools.	a8, a9
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1, b4
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b2, b3



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B4	Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints.	b2, b3, b5
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b4, b6
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b2, b6
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b1, b3, b5
B14	Summarize the proposed solutions and their results.	b3, b7
C1	Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.	c1
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c2
C3	Deploy the equipment and tools used for the construction, maintenance, and documentation of computer applications.	c1,c2
C4	Apply computing information retrieval skills in computing community environment and industry.	c7
C6	Design, implement, maintain, and manage software systems.	c2, c3, c4
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c2, c5, c6
C11	Perform independent information acquisition and management, using scientific literature and Web sources.	c3, c8
C14	Specify, design, and implement computer-based systems.	c4, c6, c7
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d1
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d1,d2
D7	Show the use of general computing facilities.	d4
D8	Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.	d3



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Course Specification

5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs.			ILOs Covered by Course
			Lec.	Tut.	Lab	
Week -1	Introduction to Geographical Data	4	2	0	2	a1,a3,a4,b2,b6,c1,d1
Week-2	Geographical Data Models and Structures	4	2	0	2	a1,a3,a4,b2,b6,c1,d1
Week-3	Attribute Data and Its Connection to Geographical Features	4	2	0	2	a6,b1,b2,c1
Week-4	Data Acquisition Techniques	4	2	0	2	b1,b2,c1,c2
Week5	Data Acquisition Techniques	4	2	0	2	b1,b2,c1,c2
Week-6	Data Integration and Preprocessing	4	2	0	2	a7,a8,c3,c4
Week-7	Quality Control and Assurance of Geometric Data	4	2	0	2	a7,a8,c3,c4
Week-8	Midterm Exam.					
Week-9	Quality Control and Assurance of Geometric Data	4	2	0	2	a7,a8,c3,c4
Week-10	Spatial Analysis Techniques	4	2	0	2	b5,c4,d1
Week-11	Data Presentation Methods	4	2	0	2	c7,c8,d2,d3
Week-12	Data Presentation Methods	4	2	0	2	c6,c7,c8,d2,d3
Week-13	Advanced Topics in Geographical Data Treatment	4	2	0	2	c6,c7,c8,d2,d3,d4
Week-14	Practical lab examination	4	2	0	2	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√		√	√	√			√					

7- Students Evaluation:

8- No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	9	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	-
7	Assignments / Project	Weekly	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



9- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	- "Fundamentals of Geographic Information Systems" by Michael N. DeMers (2021). - "Geographic Information Science: Mastering the Basics" by Michael P. Peterson (2020)
	Other References	None
	Electronic Sources (Links must be added)	Websites and Online Resources: 1. ESRI's ArcGIS Resources (https://resources.arcgis.com/) • Tutorials, documentation, and best practices for GIS 2. QGIS Documentation (https://docs.qgis.org/) • Comprehensive guide for the open-source QGIS software 3. NASA Earth Data (https://earthdata.nasa.gov/) • Access to various Earth observation datasets and tools
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Mona Mohamed Fouad	Dr. Rania Ragab Hussien
Signature		



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Course Specification

Course Code: CS 435

Course Name: E-Banking

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 4		
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 302							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Rania Ragab Hussien 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course covers technology for managing payments across electronic networks, including the banking and electronic funds transfer network. Payment gateways, electronic presentment, clearance, and dishonor, credit card transactions, and electronic bill payment. Properties and examples of digital cash: e-cash, cyber-cash, electronic purses, negotiable electronic instruments, secure checks, billing servers, micropayments. Authenticity, integrity, probability of transactions, methods for assuring delivery before payment: electronic bills, letters of credit, risks: money laundering, kiting, offshore issues, allocation of risk among buyer, seller, bank and intermediaries.



3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a1. Understand the architecture and operational mechanisms of banking and electronic funds transfer networks.
- a2. Explain the role and functionality of payment gateways within electronic payment systems.
- a3. Describe the processes involved in electronic presentment, clearance, and handling of dishonored transactions.
- a4. Comprehend the mechanisms for credit card transactions and electronic bill payments.
- a5. Identify and differentiate between types of digital cash, including e-cash, cyber-cash, and electronic purses.
- a6. Understand the properties and applications of negotiable electronic instruments, secure checks, and billing servers.
- a7. Recognize methods for ensuring the authenticity, integrity, and provability of electronic transactions.
- a8. Understand strategies for assuring delivery before payment, such as electronic bills and letters of credit.
- a9. Identify and analyze risks associated with electronic payments, including money laundering, kiting, and offshore issues.
- a10. Comprehend strategies for managing and mitigating these financial risks.
- a11. Understand how risk is allocated among buyers, sellers, banks, and intermediaries in electronic payment systems.
- a12. Propose solutions for balancing risk and ensuring secure transactions within the electronic payment ecosystem.
- a13. Understand how risk is allocated among buyers, sellers, banks, and intermediaries in electronic payment systems.
- a14. Propose solutions for balancing risk and ensuring secure transactions within the electronic payment ecosystem.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Configure and operate payment gateways effectively.
- b2. Execute processes for electronic presentment, clearance, and management of dishonored transactions.
- b3. Apply best practices for processing credit card transactions and electronic bill payments.
- b4. Manage digital cash systems and micropayments effectively.
- b5. Implement methods to ensure the security and integrity of electronic transactions.
- b6. Apply strategies for ensuring delivery before payment using electronic bills and letters of credit.
- b7. Identify and address risks in electronic payments, including implementing risk mitigation techniques.
- b8. Manage and allocate risk among various stakeholders effectively.
- b9. Analyze and resolve issues related to electronic payment systems, including troubleshooting transaction failures



c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Demonstrate adherence to ethical standards and legal compliance in managing electronic payments.
- c2. Make informed decisions based on an understanding of payment technologies and risk management.
- C3. Engage in ongoing professional development to stay current with advancements in payment technologies and industry practices.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Communicate clearly with stakeholders about payment processes, risks, and solutions.
- d.2. Provide high-quality service to customers and stakeholders, ensuring accurate and timely transaction processing.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1,a2
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a1,a3
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a4, a5, a6
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development.	a9, a10, a11, a12, a13, a14
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a7, a8
A10	Current developments in computing and information research.	a9, a10
A11	Requirements, practical constraints, and computer-based systems.	a11, a13
A12	Essential mathematics relevant to computer science.	a5, a9
A15	Interpreting and analyzing data qualitatively and/or quantitatively.	a9, a10



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A16	The principles and techniques of several application areas informed by the research directions of the subject, such as artificial intelligence, natural language processing, data mining, databases, and computer graphics.	a5, a6, a7
A18	The fundamental topics in Computer Science, including hardware and software architectures, software engineering principles and methodologies, operating systems, compilers, parallel and distributed computing, systems, and software tools.	a1, a2, a4
A19	Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing.	a5, a6, a7, a8
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b1, b3, b4, b5
B7	Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact	b7, b8
B15	Restrict solution methodologies upon their results.	b9
C6	Design, implement, maintain, and manage software systems.	c2
C8	Handle a mass of diverse data, assess risk and draw conclusions.	c2
C14	Specify, design, and implement computer-based systems.	c1,c2
D5	Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.	d2
D6	Reveal communication skills, public speaking and presentation skills, and delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.	d1



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5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs.			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Banking and Electronic Funds Transfer Network	4	2	0	2	a1, a2, b1, b2
Week-2	Payment Gateways	4	2	0	2	a1, a2, b3, c1, d1
Week-3	Electronic Presentment, Clearance, and Dishonor	4	2	0	2	a3, a4, b4, c1, d1
Week-4	Credit Card Transactions	4	2	0	2	a5, a6, b5, c1, d1
Week5	Electronic Bill Payment	4	2	0	2	a5, a6, b5, c1, d1
Week-6	Digital Cash	4	2	0	2	a6, a7, b6, c2, d1
Week-7	Billing Servers and Micropayments	4	2	0	2	a6, a7, b6, c2, d1
Week-8	Midterm Exam.					
Week-9	Transaction Authenticity, Integrity, and Provability	4	2	0	2	a7, a8, b7, c2, d1, d2
Week-10	Assuring Delivery Before Payment	4	2	0	2	a7, a8, b7, c2, d1, d2
Week-11	Risks	4	2	0	2	a9, a10, b8, c3, d2
Week-12	Allocation of Risk	4	2	0	2	a11, a12, b9, c3, d2
Week-13	Allocation of Risk	4	2	0	2	a11, a12, b9, c3, d2
Week-14	Practical lab examination	4	2	0	2	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓		✓	✓					

7- Students Evaluation:

8- No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	9	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	-
7	Assignments / Project	Weekly	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



9- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	"Electronic Payment Systems: Design and Implementation" by M. H. Hwang and S. M. Hwang "Payment Systems: Design, Governance and Oversight" by M. K. McCormick "Digital Payments: The Future of Money" by T. A. W. Fung.
	Other References	None
	Electronic Sources (Links must be added)	National Institute of Standards and Technology (NIST) Special Publication on Electronic Payment Systems European Central Bank (ECB) Publications on Payment Systems International Journal of Electronic Commerce Bank for International Settlements (BIS) Reports on Payment Systems
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

Course Code: CS 320

Course Name: Machine Learning

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 4		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:		Lab.:	2	Total	4
Pre-Requisite	CS 202							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Sara Ahmed Soliman					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course emphasizes supervised learning algorithms, including concept, decision tree, random forest, neural network, Naïve Bayes, k nearest neighbors, and support vector machines. Training and test data are discussed. Concept of learning as search through a hypothesis space. Overfitting, noisy data, and pruning. Comparing learning algorithms: cross-validation, learning curves, and statistical hypothesis testing. Hidden Markov models (HMM's) and their use for speech recognition are also discussed. The course includes also unsupervised learning, including from unclassified data and kmeans partitioned clustering.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1** Define concepts, principles, and theories relating to Machine Learning.



- a.2 Identify modeling and design of ML models bearing in mind the trade-offs.
- a.3 Identify methodologies used in design, implementation, and evaluation of ML models.
- a.4 Select criteria and specifications appropriate to specific problems, and plan strategies for their solution.
- a.5 Identify the extent to which a ML model meets the criteria defined for its current use and future development.
- a.6 Know the essential mathematics relevant to ML.
- a.7 Select high-level programming languages such as Python.
- a.8 Specify basic knowledge of linear algebra and statistics used in ML.
- a.9 Know and understand the principles and techniques of several application areas of ML.
- a.10 Show a critical understanding of the principles of ML models.
- a.11 Identify and recognize a broad range of artificial intelligence areas such as ML.
- a.12 Select advanced topics to provide a deeper understanding of some aspects of ML.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Realize the concepts, principles, theories and practices behind ML.
- b2. Provide an appropriate performance metric for evaluating ML algorithms for a given problem.
- b3. Evaluate a broad range of ML tools to real data.
- b4. Perform comparisons between different types of ML algorithms.
- b5. Perform classifications of (data, results, methods, techniques, algorithms, etc.).
- b6. Identify attributes, components, relationships, patterns, main ideas, and errors.
- b7. Recommend the proposed solutions and their results.
- b8. Predict best solution and source of errors.
- b9. Restructure solution methodologies up on their results.
- b10. Verify solutions of ML model.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Use appropriate programming languages, design methodologies, knowledge and database systems in ML models.
- c2. Use scientific visualization packages to visualize complex scientific datasets.
- c3. Design, and implement ML models.
- c4. Develop models and systems in terms of general quality attributes and possible tradeoffs presented within the given problem.
- c5. Examine, implement, adapt machine learning algorithms and analysis methods.
- c6. Compare analytical techniques and design tools in the development of ML model.
- c7. Use of standard numerical recipes and mathematical libraries in problem solving.



c8. Using tools to automate ML model.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.
- d2. Show the use of information-retrieval using ML.
- d3. Exhibit appropriate numeracy skills in understanding and presenting data involving a quantitative dimension.
- d4. Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1,a10
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development.	a5
A12	Essential mathematics relevant to computer science.	a6
A14	Demonstrating basic knowledge and understanding of a core of analysis, algebra, applied mathematics and statistics.	a6,a8
A16	The principles and techniques of several application areas informed by the research directions of the subject, such as artificial intelligence, natural language processing, data mining, databases, and computer graphics.	a9
A19	Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing.	a12
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b8,b9
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1
B10	Define traditional and nontraditional problems, set goals towards solving them, and. observes results.	b7,b9



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Course Specification

B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b4
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b6
B16	Establish criteria and verify solutions.	b10
B18	Solve computer science problems with pressing commercial or industrial constraints.	b8,b9,b10
C10	Communicate effectively by oral, written, and visual means.	c2
C13	Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy.	c3
C15	Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.	c5
C18	Apply and manage the need for continuing professional and practical development in recognition of the need for life long-learning.	c7,c8
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1
D3	Show the use of information-retrieval.	d2
D5	Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.	d3
D8	Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.	d4



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
<i>Week -1</i>	fundamental concepts of machine learning	3	2	-	2	a1,b1
<i>Week-2</i>	Concept of Supervised versus Unsupervised learning	3	2	-	2	a1,a2,b4
<i>Week-3</i>	Feature extraction and Dimensionality reduction	3	2	-	2	a3,a6,b3,c3
<i>Week-4</i>	Classifiers and Prediction	3	2	-	2	a3,a4,a5,b3,b4,b5,c1,c3,c5,d1,d2
<i>Week5</i>	Overfitting and underfitting	3	2	-	2	a4,a5,a10,b7,b8,b9,b10,d3
<i>Week-6</i>	Decision tree and classification	3	2	-	2	a3,a6,a7,a9,a10,a11,a12,b3,b4,b5,b6,c3,c4,c5,c6,c8
<i>Week-7</i>	Bayesian classifiers	3	2	-	2	a3,a6,a7,a9,a10,a11,a12,b3,b4,b5,b6,c3,c4,c5,c6,c8
<i>Week-8</i>	Midterm Exam					
<i>Week-9</i>	K-Nearest neighbor and clustering	3	2	-	2	a3,a6,a7,a9,a10,a11,a12,b3,b4,b5,b6,c3,c4,c5,c6,c8
<i>Week-10</i>	Linear and Logistic regression	3	2	-	2	a3,a6,a7,a9,a10,a11,a12,b3,b4,b5,b6,c3,c4,c5,c6,c8
<i>Week-11</i>	Support Vector Machines (SVM)	3	2	-	2	a3,a6,a7,a9,a10,a11,a12,b3,b4,b5,b6,c3,c4,c5,c6,c8
<i>Week-12</i>	Neural Networks	3	2	-	2	a3,a6,a7,a9,a10,a11,a12,b3,b4,b5,b6,c3,c4,c5,c6,c8
<i>Week-13</i>	Performance measures	3	2	-	2	A4,a5,a6,b8,b9,b10,c7,c8,d3.d4
<i>Week-14</i>	LAB AND ORAL EXAM	3	2	-	2	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√			√	√					√			

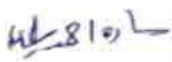
7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5 th	5	5%
2	Quiz 2 written (Semester work)	11 th	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14 th	10	10 %
6	Final Oral Exam	-	0	0
7	Assignments / Project	11 th	10	10%
8	Field training	0	0	0
9	Other (Mention)	0	0	0



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Alpaydin, Ethem. <i>Introduction to Machine Learning</i> . 4th Edition, MIT Press, 2020.
	Other References	
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Sara Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



Course Code: CS 401

Course Name: Dynamic Languages

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 4		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:		Lab.:	2	Total	4
Pre-Requisite	CS 103							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Rania Ragab Hussien					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2- Course Overview:

This course introduces the tools and techniques on the approach to language as a dynamical system. It seeks to fruitfully integrate linguistic theory, psycholinguistics, corpus linguistics, and historical linguistics through the means of mathematical modeling. Topics include string processing, dynamical systems and stability, stochastic processes, mathematical models of population dynamics, and dynamical models of language learning, processing, and change.

3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a1. Demonstrate a solid understanding of the core principles of dynamical systems theory.
- a2. Integrate concepts from linguistic theory, psycholinguistics, corpus linguistics, and historical linguistics with mathematical models to provide a comprehensive view of language dynamics.
- a3. Understand string processing techniques, including algorithms and formal



- grammars, to analyze and manipulate linguistic data.
- a4. Grasp the principles of stochastic processes and their application in modeling language phenomena, such as using Markov models and hidden Markov models.
 - a5. Understand and utilize dynamical models of language learning and processing, including reinforcement learning and neural network models, to investigate language acquisition and usage.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. analyze and evaluate theoretical models of dynamical systems as they apply to linguistic phenomena, including their assumptions, strengths, and limitations.
- b2. Apply mathematical techniques, such as differential equations, stochastic processes, and discrete models, to develop and refine models of language dynamics.
- b3. Integrate concepts and methodologies from linguistic theory, psycholinguistics, corpus linguistics, and historical linguistics into cohesive mathematical models to address complex linguistic questions.
- b4. Design dynamical models for various aspects of language study, including string processing, population dynamics, and historical linguistics, and assess their effectiveness and accuracy.
- b5. Interpret empirical data in the context of dynamical models and validate and refine these models based on data analysis and empirical evidence.
- b6. Synthesize knowledge from multiple disciplines to generate new insights into language phenomena and contribute to the development of novel dynamical models.
- b7. Synthesize theoretical knowledge with practical applications, using dynamical systems to bridge gaps between abstract linguistic theories and real-world linguistic data.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Design, develop, and implement mathematical models of dynamical systems to analyze and predict linguistic phenomena, including language evolution, learning, and processing.
- c2. Apply string processing techniques and computational tools to handle linguistic data, including regular expressions, parsing algorithms, and corpus analysis.
- c3. Collect, preprocess, and analyze empirical language data using statistical and computational methods, integrating data into dynamical models for validation and refinement.
- c4. Conduct simulations and experiments using dynamical models to test hypotheses about language learning, processing, and change, and interpret the results to inform theory and practice.
- c5. Demonstrate proficiency in using specialized software (e.g., MATLAB, Python with libraries like NumPy/SciPy, R) to build, simulate, and analyze dynamical systems in linguistic research.



- c6. Apply stochastic models and population dynamics techniques to practical problems in language study, such as predicting language shift, change, and the spread of linguistic features.
- c7. Manage and complete complex research projects that involve collecting data, building dynamical models, and conducting analyses to produce professional, publishable results.
- c8. Develop practical solutions to linguistic problems by creating and adjusting dynamical models to account for real-world data variability and complexities.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Develop strong analytical thinking and problem-solving skills by breaking down complex linguistic phenomena into manageable components through mathematical modeling and computational analysis.
- d2. Acquire the ability to independently gather, organize, and critically assess large linguistic datasets, applying appropriate techniques for empirical analysis and model testing.
- d3. Enhance both written and oral communication skills, with the ability to explain complex concepts and results of dynamical models clearly to a variety of audiences, including those with non- technical backgrounds.
- d4. Work effectively as part of interdisciplinary teams, collaborating with peers from different academic backgrounds (e.g., linguistics, mathematics, computer science) to solve complex problems related to language dynamics.
- d5. Develop strong time management and organizational skills by successfully planning and executing research projects, ensuring milestones and deadlines are met.
- d6. Demonstrate adaptability by learning and applying new mathematical and computational techniques to novel problems in the field of linguistics, enhancing long-term learning and professional growth.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a3
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development.	a4,a5
A6	The current and underlying technologies that support computer processing and inter-computer communication.	a2,a4



A17	Showing a critical understanding of the principles of artificial intelligence, image, and pattern recognition.	a1
A19	Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing.	a2
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b3
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.	b5
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b4
B10	Define traditional and nontraditional problems, set goals towards solving them, and. observes results.	b6
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b2,b7
B15	Restrict solution methodologies upon their results.	b7
C4	Apply computing information retrieval skills in computing community environment and industry.	c1,c2
C6	Design, implement, maintain, and manage software systems.	c1
C7	Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.	c3
C8	Handle a mass of diverse data, assess risk and draw conclusions.	c7
C11	Perform independent information acquisition and management, using scientific literature and Web sources.	c4
C12	Prepare and present seminars to a professional standard.	c5
C13	Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy.	c6
C14	Specify, design, and implement computer-based systems.	c8
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d1
D3	Show the use of information-retrieval.	d2
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d1



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D6	Reveal communication skills, public speaking and presentation skills, and delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.	d3,d4
D7	Show the use of general computing facilities.	d2
D8	Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.	d5,d6

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs.</i>			ILOs Covered by Course
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab</i>	
<i>Week -1</i>	Introduction to Dynamical Systems	4	2	0	2	a1, a2, b1, c1, d1
<i>Week-2</i>	String Processing	4	2	0	2	a3, b2, c2, d2
<i>Week-3</i>	Mathematical Modeling	4	2	0	2	a1, b1, b3, c1, c3, d3
<i>Week-4</i>	Stochastic Processes	4	2	0	2	a2, b2, c1, d1
<i>Week5</i>	Population Dynamics	4	2	0	2	a1, a2, b1, b2, c1, c2, d1
<i>Week-6</i>	Language Learning Models	4	2	0	2	a1, b2, c1, d3
<i>Week-7</i>	Language Processing	4	2	0	2	a1, a2, b3, c1, d2
<i>Week-8</i>	Midterm Exam.					
<i>Week-9</i>	Historical Linguistics Models	4	2	0	2	a1, b1, b3, c2, d3
<i>Week-10</i>	Corpus Linguistics Techniques	4	2	0	2	a2, b2, b3, c2, c3, d2
<i>Week-11</i>	Corpus Linguistics Techniques	4	2	0	2	a2, a3, b3, c2, c3, d2
<i>Week-12</i>	Applications and Case Studies	4	2	0	2	a1, a3, b1, b3, c2, c3, d1, d3
<i>Week-13</i>	Applications and Case Studies	4	2	0	2	a1, a2, a6, b1, b4, c1, c5, d2
<i>Week-14</i>	LAB examination	4	2	0	2	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓			✓	✓					✓			

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5 th	5	5%
2	Quiz 2 written (Semester work)	10 th	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14 th	10	10 %
6	Final Oral Exam	0	0	0
7	Assignments / Project	weekly	10	10 %
8	Field training	0	0	0
9	Other (Mention)	0	0	0



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	•Steels, L. (2011). Modeling the Origins of Language: From Neural Networks to Semiotic Dynamics. Physics of Life Reviews, 8(4), 339-356. •De Boer, B. (2016). Modeling Coevolution of Speech and Social Structure: Why Simulate? Journal of Language Evolution, 1(2), 163-175. •Ellis, N. C., & Larsen-Freeman, D. (Eds.). (2009). Language as a Complex Adaptive System. Wiley-Blackwell.
	Other References	none
	Electronic Sources (Links must be added)	• The Unicode Consortium's Website URL: unicode.org • Open Source Arabic OCR Tools Examples: Tesseract OCR with Arabic language support, Google Cloud Vision API • Arabic Speech Recognition Resources Examples: CMU Sphinx, Kaldi Speech Recognition Toolkit • Arabic Language Resources by LDC (Linguistic Data Consortium) URL: ldc.upenn.edu
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



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Computer Science Department**

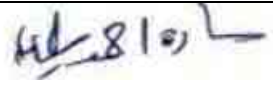
Course Specification

Course Code: CS 402

Course Name: Digital Image Processing

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 4		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 308							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Sara Ahmed Soliman 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

Overview, Computer imaging systems, Image analysis, preprocessing, Human visual system, image model. Image enhancement, gray scale mods, histogram mod, Discrete transforms, Fourier, discrete cosine, Walsh-Hadamard, Haar, PCT, filtering, filtering, wavelet transform, pseudo color, Image enhancement, sharpening, smoothing, Image restoration, overview, system model, noise removal: order filters, Image restoration: noise removal: mean & adaptive filters, degradation model, inverse filter, Freq. filters, geometric transforms, image compression: system model, lossless methods



3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1 Define image processing bearing in mind the trade-offs.
- a.2 Describe Image compression and specifications appropriate to specific problems, and plan strategies for their solution.
- a.3 Describe compression principles relevant to computing and information disciplines.
- a.4 Define Histogram manipulation.
- a.5 List the principles of object recognition using AI.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Explain with the professional issues relevant to the image processing.
- b2. Express traditional and nontraditional image problems, set goals towards solving them, and. observes results.
- b3. Explain attributes of Image enhancements in the spatial domain.
- b4. Establish criteria for histogram manipulation and verify solutions.
- b5. Generate an innovative object recognition to solve a problem containing a range of commercial and industrial constraints.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Apply compression tools, recognizing its logical and physical properties, capabilities and limitations.
- c2. Deploy tools used for the construction, processing, and restoration of images.
- c3. Assess the implications, risks or safety aspects involved in the processing of image within a specific context.
- c4. Use appropriate methods and tools, design methodologies for image compression.
- c5. Use independent information acquisition and management, using the scientific literature and Web sources in the field of image processing.
- c6. Apply image enhancements.
- c7. Apply Histogram manipulation to image of various kinds.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Demonstrating the ability to make use of a range of learning resources and to manage one's own learning.
- d2. Use IT skills and display mature computer literacy.
- d3. Show the use of general computing facilities.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a1,a2
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a2,a4
A8	Management and economics principles relevant to computing and information disciplines.	a3
A13	Using of high-level programming languages.	a4
A17	Showing a critical understanding of the principles of artificial intelligence, image, and pattern recognition.	a5
B8	Familiar with the professional, legal, moral, and ethical issues relevant to the computing industry.	b1
B10	Define traditional and nontraditional problems, set goals towards solving them, and. observes results.	b2
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b2,b3
B16	Establish criteria and verify solutions.	b4
B19	Generate an innovative design to solve a problem containing a range of commercial and industrial constraints	b5
C1	Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.	c1,c2
C3	Deploy the equipment and tools used for the construction, maintenance, and documentation of computer applications.	c2,c6



C7	Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.	c3
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c1,c2,c4
C11	Perform independent information acquisition and management, using scientific literature and Web sources.	c5
C14	Specify, design, and implement computer-based system	c2,c4,c6
C16	Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.	c5,c7
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1,d3
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community	d1,d2
D7	Show the use of general computing facilities.	d3

5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Introduction to digital image fundamentals	3	2	0	2	a1,b1,b2
Week-2	Image Intensity Transformations	3	2	0	2	a1,b1,b2
Week-3	Image enhancements in the spatial domain	3	2	0	2	b3,c3,c6
Week-4	Image enhancements in the frequency domain	3	2	0	2	b3,c3,c6,d3



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Week5	Histogram manipulation	3	2	0	2	a4,c7,d3
Week-6	Spatial Domain Filters	3	2	0	2	b2,b3,c2,c3,c5,d2,d3
Week-7	Frequency Domain Filters	3	2	0	2	b2,b3,c2,c3,c5,d2,d3
Week-8	Midterm Exam.					
Week-9	Image restoration	3	2	0	2	b2,c2,c3,c5,d1
Week-10	Edge detection	3	2	0	2	a5,b5,c5,d1,d2,d3
Week-11	Corners detection	3	2	0	2	a5,b5,c5,d1,d2,d3
Week-12	Image Segmentation	3	2	0	2	a5,b5,c5,d1,d2,d3
Week-13	Image compression	3	2	0	2	A2,a3,c1,c4,d3
Week-14	Practical Exam					

6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓			✓	✓	✓								



**Higher Technological Institute (HTI)-10th of Ramadan City
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Course Specification

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	10	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	0	0	0%
7	Assignments / Project	6,12	10	10%
8	Field training	0	0	0%
9	Other (Mention)	0	0	0%

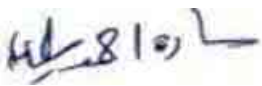


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Course Specification

8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Jähne, Bernd. Digital Image Processing: Concepts, Algorithms, and Scientific Applications. 7th Edition, Springer, 2022.
	Other References	None
	Electronic Sources (Links must be added)	None.
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Sara Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

Course Code: CS 440

Course Name: Distributed Systems

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 4		
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 310							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Rania Ragab Hussien					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

The aim of this course is to look at different parts of distributed systems by considering programming paradigms for distributed systems and the different basic distributed algorithms, which gives an impression of the basic problems involved in developing distributed systems. Also, the course discusses DS security, and how services are located. Finally, it exemplifies the application level by looking at file services, replications and distributed shared memory.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a1. Understand the fundamental concepts and architecture of distributed systems.



- a2. Identify and describe various programming paradigms used in distributed systems (e.g., client-server, peer-to-peer).
- a3. Explain the basic distributed algorithms, including consensus, synchronization, and fault tolerance.
- a4. Understand the issues related to security in distributed systems and the methods used to address them.
- a5. Describe how services are located and managed in distributed systems, including naming and directory services.
- a6. Understand the application-level aspects of distributed systems, such as file services, replication strategies and distributed shared memory.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Analyze and critically evaluate distributed algorithms for different distributed systems.
- b2. Assess the security challenges and develop strategies to mitigate risks in distributed systems.
- b3. Solve complex problems in distributed systems using appropriate programming paradigms and algorithms.
- b4. Evaluate the trade-offs between different approaches for service location and management in distributed systems.
- b5. Analyze the implications of replication and consistency in distributed shared memory and file systems.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Implement basic distributed algorithms in practical systems.
- c2. Design and develop distributed system applications with a focus on security and reliability.
- c3. Use appropriate tools and programming languages to develop, test, and deploy distributed systems (e.g., Java RMI, MPI, gRPC).
- c4. Apply replication techniques and consistency models in distributed systems applications.
- c5. Develop solutions to handle service location and naming within distributed system environments.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Work effectively in teams to design and implement distributed system solutions.
- d2. Communicate complex ideas and solutions related to distributed systems clearly in both written and oral forms.
- d3. Demonstrate the ability to adapt to new technologies and distributed system paradigms as they evolve.
- d4. Manage time and resources efficiently when working on distributed system projects.
- d5. Engage in lifelong learning by staying up to date with the latest research and developments in distributed systems.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1, a1, a2, a3, a4, a5, a6
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a2, a3, a4, a5, a6
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a3, a5, a6
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1, b3, b4, b5
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1, b2, b3
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.	b1, b2, b5
C1	Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.	c1
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c2, c4, c5
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1, d4
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d2, d3



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Course Specification

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Introduction to Distributed Systems	4	2	0	2	a1, a2, b1, c1, d1
Week-2	Distributed Systems Architecture	4	2	0	2	a2, a3, b2, c2, d2
Week-3	Programming Paradigms for Distributed Systems	4	2	0	2	a2, a3, b3, c3, d1, d3
Week-4	Basic Distributed Algorithms	4	2	0	2	a3, b1, b3, c1, c3, d4
Week5	Fault Tolerance in Distributed Systems	4	2	0	2	a4, a5, b3, c2, c4, d4
Week-6	Security in Distributed Systems	4	2	0	2	a4, b2, c2, d1, d3
Week-7	Service Location and Directory Services	4	2	0	2	a5, a6, b4, c5, d2
Week-8	Midterm Exam.					
Week-9	Distributed File Systems and Storage	4	2	0	2	a6, b4, c3, c4, d2
Week-10	Replication Techniques in Distributed Systems	4	2	0	2	a6, b3, b4, c2, d1, d3
Week-11	Distributed Shared Memory (DSM)	4	2	0	2	a6, b4, c4, c5, d2, d4
Week-12	Performance and Scalability in Distributed Systems	4	2	0	2	a3, a5, b4, b5, c2, c3, d1, d4
Week-13	Case Studies and Applications	4	2	0	2	a1, a2, a6, b1, b4, c1, c5, d2, d5
Week-14	Practical lab examination	4	2	0	2	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓				✓				

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	10	10 %
2	Quiz 2 written (Semester work)	0	0	0
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10 %
6	Final Oral Exam	0	0	0
7	Assignments / Project	10	10	10 %
8	Field training	0	0	0
9	Other (Mention)	0	0	0



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Andrew S. Tanenbaum, Maarten Van Steen – "Distributed Systems: Principles and Paradigms" (2nd Edition)
	Other References	- M.L. Liu – "Distributed Computing: Principles and Applications" - Nancy Lynch – "Distributed Algorithms"
	Electronic Sources (Links must be added)	- MIT OpenCourseWare: Distributed Systems Course - https://ocw.mit.edu - Coursera: Cloud Computing and Distributed Systems - https://www.coursera.org
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

Course Code: CS 441

Course Name: Real Time Systems

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level4		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 306							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Rania Ragab Hussien					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course presents, introduction to real time systems ; Typical real time applications ; Hard versus soft real time systems ; A reference model of real time systems ; Commonly used approaches to hard real time scheduling ; Clock-driven scheduling ; Priority-driven scheduling of periodic tasks ; Scheduling periodic and Sporadic tasks ; Resources and resource access control ; Multiprocessor scheduling and resource access control ; Scheduling flexible computations and tasks with temporal distance constraints ; Real time communications ; Real time operating system ; Real time programming languages.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:



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- a.1. Understand the principles of real-time systems, their scheduling, and resource management.
- a.2. Knowledge of different scheduling algorithms like clock-driven, priority-driven, and multiprocessor scheduling.
- a.3. Understand how real-time operating systems and communications integrate into real-time system design.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Ability to analyze the scheduling techniques and algorithms in real-time systems.
- b.2. Critical thinking applied to system performance and resource access control.
- b.3. Problem-solving applied to flexible computations and multiprocessor scheduling.

.....

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Design and implement scheduling mechanisms in real-time systems.
- c.2. Apply multiprocessor scheduling and task management strategies in real-time environments.
- c.3. Manage real-time communications and operating systems effectively.

.....

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Effective teamwork in system design and problem-solving.
- d.2. Clear communication of complex technical concepts.
- d.3. Adaptability to evolving real-time system technologies and methodologies.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A8	Management and economics principles relevant to computing and information disciplines.	a1
A9	Professional, moral, and ethical issues involved in the exploitation of computer technology and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.	a2
A10	Current developments in computing and information research.	a3
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.	b1
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b3
B7	Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact.	b2
C4	Apply computing information retrieval skills in computing community environment and industry.	c3
C6	Design, implement, maintain, and manage software systems.	c1
C8	Handle a mass of diverse data, assess risk and draw conclusions.	c2
D3	Show the use of information-retrieval.	d1
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d2
D8	Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.	d3



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Course Specification

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Introduction to Real-Time Systems	4	2	-	2	a1, a2, b1, c1, d1
Week-2	Typical Real-Time Applications	4	2	-	2	a3, b2, c2, d2
Week-3	Hard vs. Soft Real-Time Systems	4	2	-	2	a1, b1, b3, c1, c3, d3
Week-4	A Reference Model of Real-Time Systems	4	2	-	2	a2, b2, c1, d1
Week5	Common Approaches to Hard RealTime Scheduling	4	2	-	2	a1, a2, b1, b2, c1, c2, d1
Week-6	Clock-Driven Scheduling	4	2	-	2	a1, b2, c1, d3
Week-7	Priority-Driven Scheduling of Periodic Tasks	4	2	-	2	a1, a2, b3, c1, d2
Week-8	Midterm Exam.					
Week-9	Scheduling Periodic and Sporadic Tasks	4	2	-	2	a1, b1, b3, c2, d3
Week-10	Resource and Resource Access Control	4	2	-	2	a2, a3, b3, c2, c3, d2
Week-11	Multiprocessor Scheduling and Resource Access Control	4	2	-	2	a2, a3, b3, c2, c3, d2
Week-12	Scheduling Flexible Computations and Tasks with Temporal Distance Constraints	4	2	-	2	a1, a3, b1, b3, c2, c3, d1, d3
Week-13	Real-Time Communications. Real-Time Operating Systems (RTOS).	4	2	-	2	a1, a2, a6, b1, b4, c1, c3, c5, d1, d2, d5
Week-14	LAB Exam					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓		✓	✓					

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	5	5%
2	Quiz 2 written (Semester work)	13	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10%	10%
6	Final Oral Exam	-	0	-
7	Assignments / Project	All Weeks	10	10%
8	Field training	-	0	-
9	Other (Mention)	-	0	-



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	• Lecturer Notes (PDF file, Presentation, and Word documents). • Hermann Kopetz, Real-Time Systems: Design Principles for Distributed Embedded Applications, Springer, 2011. • Rajib Mall, Real-Time Systems: Theory and Practice, Pearson, 2008. • Alan Burns, Andy Wellings, Real-Time Systems and Programming Languages, AddisonWesley, 4th Edition, 2009. • Albert M. K. Cheng, Real-Time Systems: Scheduling, Analysis, and Verification, Wiley, 2002.
	Other References	None.
	Electronic Sources (Links must be added)	None.
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

Course Code: CS 444

Course Name: Virtual Reality

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 4		
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 308							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Rania Ragab					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

The main objective of this course is to introduce virtual reality and to give the student the basic skills to understand and evaluate VR systems, applications and simulators and its impact on future digital systems and user interfaces. This course Suits for students of all fields. It gives the basic skills to understand and evaluate VR systems, applications and simulators and its impact on future digital systems and user interfaces.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1 Demonstrate an understanding of the fundamental concepts, technologies, and components of virtual reality systems.



- a.2 Explain the geometry, physics, and perception of virtual worlds, as well as the principles of light and optics and their application to virtual reality displays.
- a.3 Analyze the challenges and opportunities of motion in real and virtual worlds, including velocities, acceleration, and collision detection, as well as tracking systems and their application to virtual reality.
- a.4 Identify different interaction techniques and audio systems in virtual reality and how they impact the design and evaluation of virtual reality systems and experiences.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Analyze and evaluate the design and implementation of virtual reality systems.
- b2. Develop strategies for solving problems related to virtual reality, including geometric modeling, tracking, and interaction.
- b3. Critically evaluate research and development in the field of virtual reality, including its impact on society and human behavior.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Develop practical skills in the design and implementation of virtual reality systems, including visual rendering, motion simulation and tracking, interaction techniques, and audio rendering and naturalization.
- c2. Apply evaluation methods to assess the effectiveness and usability of virtual reality systems and experiences and develop recommendations for improvement.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Develop effective communication skills, including oral and written communication of technical concepts related to virtual reality.
- d2. Develop collaborative skills by working in teams on virtual reality projects.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1, a2, a3, a4
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a2, a3, a4
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a3, a4
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1, b2
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1, b2, b3
C1	Operate computing equipment, recognizing its logical and physical properties, capabilities, and limitations.	c1
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c1, c2
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d2



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Course Specification

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Introduction: Virtual Reality in a Nutshell	4	2	-	2	a1
Week-2	Requirements Engineering and Storyboarding: - Example: Ship Simulator Design - Summary and Pondering Points	4	2	-	2	a2, b2, c1
Week-3	Object and Scene Modeling: - Object Modeling - Scene Construction - Object Placement - Multiple Frames of Reference	4	2	-	2	a2, b2, c1
Week-4	Putting It All Together: - Example Continued: Ship Simulator, Level 2 Design. - Summary and Pondering Points.	4	2	-	2	a1, b3, c1, c2
Week5	Performance Estimation and System Tuning: - Tuning with LOD Models - Presence/Special Effects - Using Images and Textures.	4	2	-	2	a1, b3, c1, c2
Week-6	Creating the Virtual Reality: - Output Display. - The Human Visual System	4	2	-	2	a1,b3, c1,c2,d1
Week-7	Human Depth Perception and Stereoscopy	4	2	-	2	a1, b3, c1,c2,d1
Week-8	Midterm Exam.					
Week-9	Visual Display Systems - Human Aural System - Aural Display Systems - Haptics	4	2	-	2	a3, b1,b2, b3, c1,c2 ,d1, d2
Week-10	Stimulation of Other Modalities I - Summary and Pondering Points.	4	2	-	2	a3, b1,b2, b3, c1,c2 ,d1, d2
Week-11	Sensors and Input Processing: - Trackers - Event Generators - Sensor Errors and Calibration	4	2	-	2	a3, b3, c1,c2 ,d1, d2
Week-12	3D Multimodal Interaction Design.	4	2	-	2	a4,b1,b2,b3, c1,c2,d1
Week-13	Interfaces	4	2	-	2	a4,b1,b2,b3, c1,c2,d1
Week-14	LAB AND ORAL EXAM					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓			✓	✓								

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	10	10 %
2	Quiz 2 written (Semester work)	0	0	0
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10 %
6	Final Oral Exam	0	0	0
7	Assignments / Project	13	10	10 %
8	Field training	0	0	0
9	Other (Mention)	0	0	0



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	1. "VIRTUAL REALITY", Steven M. LaValle. Cambridge University Press, 2021.
	Other References	Virtual Reality Technology" by Grigore C. Burdea and Philippe Coiffet • "Understanding Virtual Reality: Interface, Application, and Design" by William R Sherman and Alan B Craig .
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

Course Code: CS 498

Course Name: Senior Project (1)

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 4		
Term/ Academic year	Oct		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	1	Tutorial:		Lab.:	2	Total	3
Pre-Requisite	CS 202							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr/Sarah Ahmed Soliman					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course is intended to give the student a chance to put to practical use all the knowledge acquired since starting the program. It focuses on a specific problem, preferably a real life one, and culminates in an innovative software/hardware solution. This course in particular should develop the groundwork for the required solution, especially a meticulous systems analysis study. A system design phase should be carried out, with a prototype or some preliminary implementation highly recommended. The student can work individually or within a group of a reasonable size.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1.Current developments in computing and information research.
- a.2.Define essential mathematics relevant to computer science.
- a.3. Define basic knowledge and understanding of a core of analysis, algebra, applied mathematics, and statistics, and their application in solving computational and engineering problems
- a.4.Define Requirements, practical constraints, and computer-based systems.



a.5. Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and implementation.

a.6. Demonstrate artificial intelligence, and parallel and concurrent computing tools.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

b.1. Analyze, propose and evaluate alternative computer systems and processes considering limitations, and quality constraints.

b.2. Explain making ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.

b.3. Evaluate the results of tests to investigate the functionality of computer systems.

b.4. Evaluate research papers in a range of knowledge areas.

b.5. Define traditional and nontraditional problems, set goals towards solving them, and observes results.

b.6. Perform comparisons between (algorithms, methods, techniques...etc).

b.7. Solve Computer problems with pressing commercial, time, and industrial constraints.

b.8. Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

c.1. Operate computing equipment, recognizing its logical and physical properties, capabilities and limitations.

c.2. Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.

c.3. Apply computing information retrieval skills in computing community environment and industry.

c.4. Develop a range of fundamental research skills, through the use of online resources, technical repositories and library-based material.

c.5. Design, implement, maintain, and manage software systems.

c.6. Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.

c.7. Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.

c.8. Communicate effectively by oral, written and visual means.

c.9. Prepare and present seminars to a professional standard, demonstrating effective communication, critical analysis, and the ability to engage an academic or professional audience.

c.10. Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy

c.11. Specify, design, and implement computer-based systems.

c.12. Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.

c.13. Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.



c.14. Apply the principles of human-computer interaction to the evaluation and construction of a wide range of materials including user interfaces, web pages, and multimedia systems.

c.15. Apply and manage the need for continuing professional and practical development in recognition of the need for life long-learning

d. General and transferable skills:

On successful completion of the courses, students should be able to:

d.1. Demonstrating the ability to make use of a range of learning resources and to manage one's own learning.

d.2. Demonstrating skills in group working, team management, time management and organizational skills.

d.3. Use IT skills and display mature computer literacy.

d.4. Reveal communication skills, public speaking and presentation skills, and delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.

d.5. Show the use of information-retrieval.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A8	Management and economics principles relevant to computing and information disciplines	a.1
A9	Professional, moral, and ethical issues involved in the exploitation of computer technology	a.1
A10	Current developments in computing and information research	a.1
A11	Requirements, practical constraints, and computer-based systems	a.4
A15	Interpreting and analyzing data qualitatively and/or quantitatively	a.2, a.3
A19	Selecting advanced topics for deeper understanding (hardware design, OOP, AI, parallel/concurrent computing)	a.5, a.6
B3	Identify criteria to measure and interpret the appropriateness of a computer system	b3
B4	Analyze, propose and evaluate alternative computer systems and processes	b1
B6	Evaluate results of tests to investigate computer system functionality	b3
B7	Achieve judgments considering balanced costs, safety, quality, etc.	b7
B8	Familiar with professional, legal, and ethical issues	b2
B9	Evaluate research papers in knowledge areas	b4
B12	Perform classifications of data, results, algorithms, etc.	b6
B18	Solve computer science problems with commercial/industrial constraints	b7
B19	Generate innovative designs considering industrial constraints	b8
C1	Operate computing equipment, recognizing logical & physical properties	c1
C2	Implement computing knowledge in projects & practical problems	c2



C4	Apply computing information retrieval skills	c3
C5	Develop fundamental research skills	c4
C6	Design, implement, maintain and manage software systems	c5
C7	Assess implications, risks, safety aspects in computing operations	c6
C9	Use appropriate programming languages and tools	c9
C10	Communicate effectively (oral, written, visual)	c8
C12	Prepare and present seminars to a professional standard	c9
C13	Prepare technical reports & dissertation, use IT skills	c10
C14	Specify, design, and implement computer-based systems	c11
C15	Evaluate systems considering quality attributes/trade-offs	c12
C16	Apply principles of effective information management & retrieval	c7, c13
C17	Apply human-computer interaction to systems & interfaces	c14
C18	Manage continuing professional & practical development	c15
D1	Demonstrate ability to use learning resources & self-learning	d1
D2	Demonstrate teamwork, management, and organizational skills	d2
D3	Show use of information-retrieval	d5
D4	Use tools to prepare/present reports for different audiences	d3, d4
D6	Reveal communication, public speaking, writing & presentation skills	d4
D8	Demonstrate appreciation of life-long learning	d1, d2

5- Course Schedule:

Project Classifications:

- Parallel Processing
- Artificial Intelligence
- Systems Programming
- Distributed Systems
- Information Systems
- Networks and ICT
- Formal Specifications
- Web Programming
- General Applications
- Simulation
- Computer Aided Design
- Microprocessor Applications and Peripherals
- Graphical Systems and Applications

6- Article (40): Graduation Project



In the final two semesters, a senior student must be engaged in one of the research laboratories of the corresponding department to carry out his/her graduation project. The graduation project weights six credit hours distributed on two semesters. One credit hour for the project is equivalent to four contact hours in labs/practical because the student needs to stay enough time in a research lab during the project period according to the department best practices. The student must earn at least 100 Credit Hours Level (including successfully passing all of program's Level Three mandatory courses required by the project) to register for the graduation project. The first part of the graduation project must be registered first, while the second part of the graduation project can be registered the semester following that of the first part.

How to Choose a Project?

The list of projects for each semester will be available at the beginning of the semester. This list will contain the projects title and names of supervisors. The main selection and allocation of students to projects was made at the beginning of the semester. It is possible for students to propose their own projects, in which case, they should prepare a proposal and give it to the Graduation Project Committee (GPC). Usually each project is suitable for more than one student (normally 3 students). Therefore, groups of three students should be arranged by students themselves. Each group of three students should make three choices of projects on the selection form obtained from the GPC. Students are strongly encouraged to see the associated members of staff for projects they are interested in, to find out more about the projects.

OWN Projects

If a student has successfully negotiated a project - outside the list of projects given by the department - with the project committee, and possibly a prospective supervisor, he/she still gives another 2 choices, and code choice number 1 as "OWN"; this is likely to be the student's first choice, but it does not have to be.

Project Timetable

You are expected to be in regular attendance working on your project. You must cooperate in maintaining regular contact with your supervisor. It is an attendance requirement that you see your supervisor every week during term time. The formal project deliverables are a demonstration with discussion, and a written report. Not contacting your supervisor regularly is equivalent to absence from lectures which shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final presentation of the project and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course. The project lifecycle should follow a sensible methodology and include the various stages identified in any Software Engineering course. Work on the project itself, use of equipment and computing facilities, must finish at the end of the 16th week of the semester. In some cases, this can be extended to another semester. The project report and the Auxiliary Appendix together with any relevant discs, logic circuit and wiring diagrams etc., must be handed in to the Graduation Project Committee after being signed by the supervisor by the end of the 16th week of the second semester. The GPC will announce a timetable for all project discussions. It forms a number of discussion committees, where



each consists of two staff members and discusses one project. The formal demonstrations and project discussion take place within one week after the submission of the report. The demonstration and discussion will contribute to the assessment of the "Quality of the project work".

7- Teaching and Learning and Assessment methods for Students with special needs:

The subdivision of marks within the project is:

- The supervisor mark: 40%
- The Project committee mark: 60% divided into:
 - Demonstration, 20%
 - Discussion, 20%
 - Report, 20%

Note that the 20% is awarded for the report judged as a report only, independent of the quality of the work being described.

Marking Scheme for Reports

The report, as a document, is worth 20% of the project mark. These marks are divided among the following headings:

- Organization (5%): balance of content, clarity, flow, relevance.
- Context (5%): discussion of background, aims, and significance of achievements.
- Literacy (5%): English, style, report manner.
- Presentation (5%): tidy layout, headings, references, diagrams.

8- Demonstration

The demonstration is an informal presentation of the results of the project to one of the project discussion committee. The students will say briefly, what the aims of the project are, and will then demonstrate the results for example by running the program or using the equipment constructed. The duration is about 20 minutes. See Guidance on demonstrations below for more information.

9- Report

The report is a formal written report on the project. This must be word processed. The report must follow a set of standards, given below, to facilitate its inclusion in the library and its usefulness for subsequent readers. Besides these, student will find it useful to read the slides of the talk given on writing, which is given in the lecture.

Copies of previous graduation project reports are available for reference in the Department.

Project documentation may be prepared on the PCs and printed on a laser printer. Students should hand in three soft cover copies of the report. After the discussion with the discussion committee, students should make all the correction that are suggested by the committee within the specified period of time under the supervision of their supervisors, then they should be handed in three Blue color hard cover copies of the project. The title of the project, the University, Faculty, Department names, and students' names are all written in Golden color.



10- Overhead Projector

Students are expected to make reasonable use of the overhead projector or power point presentation on the day of their demonstrations.

11- Guidance on Demonstrations

A demonstration lasts about 20 minutes. The group of students should aim to spend no more than 10 minutes summarizing what their project is designed to achieve and showing what it currently does achieve. The rest of the time is spent in answering questions.

Note: Students should not attempt to demonstrate on the computer every last thing their program can do. A demonstration of its basic operation plus one or two highlights should suffice.

The mark given for the demonstration is based on the quality and quantity of the work attempted and the final state of achievement.

Students should have their working documents to hand and appropriate reference material, design workings, reasonably up-to-date listings, examples, tests, etc. They are not giving a 20-minute seminar; at least half the time must be available for questions.

Obviously, the kinds of things that are sensibly shown in a demonstration vary from project to project. If students are in doubt as to what to show, they should ask their Supervisors.

The discussion committee consists of two staff members. In general, the supervisor of the project is not present. In general, students should be available and ready to start their demonstrations at least within one week of their submission of the project.

12- Report Standards

- a. The report is a formal written account of the project, satisfying certain standards for inclusion in a library. Students must hand in all relevant work on the project by the end of the 11th week of the second semester. In addition to the report, this includes program listings, discs, detailed logic and wiring lists, etc. It is important to meet this deadline. When students hand this to their supervisors it must be accompanied by a signed version of a form supplied by the GPC. In the case of programming projects, program listings must be submitted in some bound form in an "Auxiliary Appendix" that does not need to satisfy any standard apart from being neat and tidy. It is suggested however that an economical listing would be double-sided on A4.

Here is a suggested structure for a report. Some projects may be rather different from others, and therefore have good reasons for not following these suggestions exactly. Supervisor guidance should anyway be sought!

- Introduction (1st chapter). What is the overall aim of the project. Why is it worth doing? Who will benefit from it? If the overall aim can be split into a number of sub goals, this is a possible place to do it. Finish with a chapter by chapter overview of the rest of the report.
- Background (2nd chapter). Analyze the background to the project. This should mention any previous work, here or elsewhere, and explain its relevance to the project. This could be an appropriate place to justify the choice of platform/software etc. used in the project.



- Description of the student's own work: Design and Implementation (a chapter each). The structure of these chapters may reflect the project lifecycle, but do not write a diary of progress. The design should be clearly described and justified. Supporting diagrams should be used where appropriate and helpful. Keep your design description fairly high level. When describing implementation, confine yourself to the important, difficult, or interesting bits. Do not include large chunks of code. Figures may well be useful.
 - Results (1 chapter). What is the resulting system like to use. Include screen shots as appropriate.
 - Testing and Evaluation (1 chapter). What testing was done? How confident are student that everything works correctly, and what evidence can they produce to support this claim? Have students evaluated the system against its aims? How did they make this evaluation?
 - Conclusions (last chapter). What conclusions can students draw from the whole project? This should include a clear statement of what has been achieved overall, and will normally continue by suggesting areas of further related work, which could be done.
- b. The report itself (apart from technical considerations) is worth 25% of the project mark. However, it forms the basis of an independent assessment of the project and therefore has greater effect than 25% in practice.
- c. The report must be on paper of A4 size (210 x 297 mm). Only one side of paper should be used except in the Auxiliary Appendix.
- d. The report must be produced using word processing facilities. The body of the report should be suitably divided into chapters and sections. Chapters, sections, pages, figures

and appendices should all be numbered. Chapters, sections and appendices should have a heading. Each chapter should start on a new page. The body of the report should be preceded by a temporary title page, an abstract and a list of contents, and it should be followed by the references and then any appendices.

References to other published work should follow the conventions used in giving references in published work. e.g.: [1] P.J. Denning. Human error and the search for blame, *Communications of the ACM* 33(1): pp 6-7, January 1990. The abstract page must give the title, author, and supervisor, as well as an abstract of the project.

- e. Straightforward and peripheral aspects of the work done should be mentioned only briefly, and description and explanation concentrated on important and interesting aspects. No extra credit is gained by writing a long report and excessive length is detrimental. More detailed description should be placed in appendices to the report. The appendices and/or the Auxiliary Appendix should contain any further documentation. Only the report itself will be held in the Department. Therefore, where important material is not included in it, e.g. because it is not convenient to produce it in A4 format, or it would be too bulky, it may sometimes be appropriate to include extracts in the report.



In general, it is an infringement of copyright to reproduce any material, except short acknowledged quotations, from a published book or journal without the written permission of the publisher.

Except for the copying of material that is clearly from internal documents of the Department, any copying of books, journals, or documents required for the report should be checked with the supervisor before it is carried out.

Any material that is copied must be acknowledged as such. Attempting to present material written by others as your own is plagiarism and a serious disciplinary offence, as described in the University guidelines in the Undergraduate Handbook.

14- Avoiding Plagiarism

- a. Unacknowledged direct copying from the work of another person, or the close paraphrasing of somebody else's work, is called plagiarism and is a serious offence, equated with cheating in examinations. This applies to copying both from other students' work and from published sources such as books, reports or journal articles.
- b. Paraphrasing, when the original statement is still identifiable and has no acknowledgement, is plagiarism. A close paraphrase of another person's work must have an acknowledgement to the source. It is not acceptable for you to put together unacknowledged passages from the same or from different sources linking these together with a few words or sentences of your own and changing a few words from the original text: this is regarded as over-dependence on other sources, which is a form of plagiarism.
- c. Direct quotations from an earlier piece of your own work, if not attributed, suggest that your work is original, when in fact it is not. The direct copying of one's own writings qualifies as plagiarism if the fact that the work has been or is to be presented elsewhere is not acknowledged.
- d. Plagiarism is a serious offence and will always result in imposition of a penalty. In deciding upon the penalty, the Department will take into account factors such as the year of study, the extent and proportion of the work that has been plagiarized, and the apparent intent of the student. The penalties that can be imposed range from a minimum of a zero mark for the work (without allowing resubmission) through caution to disciplinary measures (such as suspension or expulsion).

15- Teaching and Learning and Assessment methods:



Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
	✓	✓	✓	✓	✓	✓	✓		✓	✓					

16- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Class work for Lab. / Tutorial	Weeks 4,7,10,13	40	40%
2	Class work for lecture	week Sixteenth	60	60%

17- Learning Resources and Supportive Facilities



Learning resources (books, scientific references, etc.) *	The main (essential) reference	Mikael Berndtsson , Jörgen Hansson Björn Olsson , Björn Lundell,"Thesis Projects A Guide for Students in Computer Science and Information Systems" Second Edition,2008
	Other References	C. W. Dawson, "The Essence of Computing Projects, A Student's Guide", Prentice Hall 2000.
	Electronic Sources (Links must be added)	https://www.cs.york.ac.uk/projects/howtodo.html
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr/Sarah Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

Course Code: CS 499

Course Name: Senior Project (2)

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 4		
Term/ Academic year	Feb		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	1	Tutorial:		Lab.:	2	Total	3
Pre-Requisite	CS 498							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr/Sarah Ahmed Soliman					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course aims at implementing the system designed in CS 498. A software/hardware product should be targeted, taking the good look and modest cost into consideration. A judging committee should be formed to evaluate the work and assign the student a suitable grade.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1.Current developments in computing and information research.
- a.2.Define essential mathematics relevant to computer science.
- a.3. Define basic knowledge and understanding of a core of analysis, algebra, applied mathematics, and statistics, and their application in solving computational and engineering problems
- a.4.Define Requirements, practical constraints, and computer-based systems.
- a.5.Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and implementation.



a.6. Demonstrate artificial intelligence, and parallel and concurrent computing tools.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1. Analyze, propose and evaluate alternative computer systems and processes considering limitations, and quality constraints.
- b.2. Explain making ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.
- b.3. Evaluate the results of tests to investigate the functionality of computer systems.
- b.4. Evaluate research papers in a range of knowledge areas.
- b.5. Define traditional and nontraditional problems, set goals towards solving them, and observe results.
- b.6. Perform comparisons between (algorithms, methods, techniques...etc).
- b.7. Solve Computer problems with pressing commercial, time, and industrial constraints.
- b.8. Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1. Operate computing equipment, recognizing its logical and physical properties, capabilities and limitations.
- c.2. Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.
- c.3. Apply computing information retrieval skills in computing community environment and industry.
- c.4. Develop a range of fundamental research skills, through the use of online resources, technical repositories and library-based material.
- c.5. Design, implement, maintain, and manage software systems.
- c.6. Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.
- c.7. Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.
- c.8. Communicate effectively by oral, written and visual means.
- c.9. Prepare and present seminars to a professional standard, demonstrating effective communication, critical analysis, and the ability to engage an academic or professional audience.
- c.10. Prepare technical reports, and a dissertation, to a professional standard; use IT skills and display mature computer literacy
- c.11. Specify, design, and implement computer-based systems.
- c.12. Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.
- c.13. Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.
- c.14. Apply the principles of human-computer interaction to the evaluation and construction of a wide range of materials including user interfaces, web pages, and multimedia systems.
- c.15. Apply and manage the need for continuing professional and practical development in recognition of the need for life long-learning



Higher Technological Institute (HTI)
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d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1. Demonstrating the ability to make use of a range of learning resources and to manage one's own learning.
- d.2. Demonstrating skills in group working, team management, time management and organizational skills.
- d.3. Use IT skills and display mature computer literacy.
- d.4. Reveal communication skills, public speaking and presentation skills, and delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.
- d.5. Show the use of information-retrieval.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A8	Management and economics principles relevant to computing and information disciplines	a.1
A9	Professional, moral, and ethical issues involved in the exploitation of computer technology	a.1
A10	Current developments in computing and information research	a.1
A11	Requirements, practical constraints, and computer-based systems	a.4
A15	Interpreting and analyzing data qualitatively and/or quantitatively	a.2, a.3
A19	Selecting advanced topics for deeper understanding (hardware design, OOP, AI, parallel/concurrent computing)	a.5, a.6
B3	Identify criteria to measure and interpret the appropriateness of a computer system	b3
B4	Analyze, propose and evaluate alternative computer systems and processes	b1
B6	Evaluate results of tests to investigate computer system functionality	b3
B7	Achieve judgments considering balanced costs, safety, quality, etc.	b7
B8	Familiar with professional, legal, and ethical issues	b2
B9	Evaluate research papers in knowledge areas	b4
B12	Perform classifications of data, results, algorithms, etc.	b6
B18	Solve computer science problems with commercial/industrial constraints	b7
B19	Generate innovative designs considering industrial constraints	b8
C1	Operate computing equipment, recognizing logical & physical properties	c1
C2	Implement computing knowledge in projects & practical problems	c2
C4	Apply computing information retrieval skills	c3
C5	Develop fundamental research skills	c4



C6	Design, implement, maintain and manage software systems	c5
C7	Assess implications, risks, safety aspects in computing operations	c6
C9	Use appropriate programming languages and tools	c9
C10	Communicate effectively (oral, written, visual)	c8
C12	Prepare and present seminars to a professional standard	c9
C13	Prepare technical reports & dissertation, use IT skills	c10
C14	Specify, design, and implement computer-based systems	c11
C15	Evaluate systems considering quality attributes/trade-offs	c12
C16	Apply principles of effective information management & retrieval	c7, c13
C17	Apply human-computer interaction to systems & interfaces	c14
C18	Manage continuing professional & practical development	c15
D1	Demonstrate ability to use learning resources & self-learning	d1
D2	Demonstrate teamwork, management, and organizational skills	d2
D3	Show use of information-retrieval	d5
D4	Use tools to prepare/present reports for different audiences	d3, d4
D6	Reveal communication, public speaking, writing & presentation skills	d4
D8	Demonstrate appreciation of life-long learning	d1, d2

5- Course Schedule:

Project Classifications:

- Parallel Processing
- Artificial Intelligence
- Systems Programming
- Distributed Systems
- Information Systems
- Networks and ICT
- Formal Specifications
- Web Programming
- General Applications
- Simulation
- Computer Aided Design
- Microprocessor Applications and Peripherals
- Graphical Systems and Applications

6- Article (40): Graduation Project

In the final two semesters, a senior student must be engaged in one of the research laboratories of the corresponding department to carry out his/her graduation project. The graduation project weights six credit hours distributed on two semesters. One credit hour for the project is equivalent to four contact hours in labs/practical because the student needs to stay enough time in a research lab during the project period according to the department best practices. The student must earn at least 100 Credit Hours Level



(including successfully passing all of program's Level Three mandatory courses required by the project) to register for the graduation project. The first part of the graduation project must be registered first, while the second part of the graduation project can be registered the semester following that of the first part.

How to Choose a Project?

The list of projects for each semester will be available at the beginning of the semester. This list will contain the projects title and names of supervisors. The main selection and allocation of students to projects was made at the beginning of the semester. It is possible for students to propose their own projects, in which case, they should prepare a proposal and give it to the Graduation Project Committee (GPC). Usually each project is suitable for more than one student (normally 3 students). Therefore, groups of three students should be arranged by students themselves. Each group of three students should make three choices of projects on the selection form obtained from the GPC. Students are strongly encouraged to see the associated members of staff for projects they are interested in, to find out more about the projects.

OWN Projects

If a student has successfully negotiated a project - outside the list of projects given by the department - with the project committee, and possibly a prospective supervisor, he/she still gives another 2 choices, and code choice number 1 as "OWN"; this is likely to be the student's first choice, but it does not have to be.

Project Timetable

You are expected to be in regular attendance working on your project. You must cooperate in maintaining regular contact with your supervisor. It is an attendance requirement that you see your supervisor every week during term time. The formal project deliverables are a demonstration with discussion, and a written report. Not contacting your supervisor regularly is equivalent to absence from lectures which shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final presentation of the project and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course. The project lifecycle should follow a sensible methodology and include the various stages identified in any Software Engineering course. Work on the project itself, use of equipment and computing facilities, must finish at the end of the 16th week of the semester. In some cases, this can be extended to another semester. The project report and the Auxiliary Appendix together with any relevant discs, logic circuit and wiring diagrams etc., must be handed in to the Graduation Project Committee after being signed by the supervisor by the end of the 16th week of the second semester. The GPC will announce a timetable for all project discussions. It forms a number of discussion committees, where each consists of two staff members and discusses one project. The formal demonstrations and project discussion take place within one week after the submission of the report. The demonstration and discussion will contribute to the assessment of the "Quality of the project work".

7- Teaching and Learning and Assessment methods for Students with special needs:



The subdivision of marks within the project is:

- The supervisor mark: 40%
- The Project committee mark: 60% divided into:
 - Demonstration, 20%
 - Discussion, 20%
 - Report, 20%

Note that the 20% is awarded for the report judged as a report only, independent of the quality of the work being described.

Marking Scheme for Reports

The report, as a document, is worth 20% of the project mark. These marks are divided among the following headings:

- Organization (5%): balance of content, clarity, flow, relevance.
- Context (5%): discussion of background, aims, and significance of achievements.
- Literacy (5%): English, style, report manner.
- Presentation (5%): tidy layout, headings, references, diagrams.

8- Demonstration

The demonstration is an informal presentation of the results of the project to one of the project discussion committee. The students will say briefly, what the aims of the project are, and will then demonstrate the results for example by running the program or using the equipment constructed. The duration is about 20 minutes. See Guidance on demonstrations below for more information.

9- Report

The report is a formal written report on the project. This must be word processed. The report must follow a set of standards, given below, to facilitate its inclusion in the library and its usefulness for subsequent readers. Besides these, student will find it useful to read the slides of the talk given on writing, which is given in the lecture.

Copies of previous graduation project reports are available for reference in the Department.

Project documentation may be prepared on the PCs and printed on a laser printer. Students should hand in three soft cover copies of the report. After the discussion with the discussion committee, students should make all the correction that are suggested by the committee within the specified period of time under the supervision of their supervisors, then they should be handed in three Blue color hard cover copies of the project. The title of the project, the University, Faculty, Department names, and students' names are all written in Golden color.

10- Overhead Projector

Students are expected to make reasonable use of the overhead projector or power point presentation on the day of their demonstrations.



11- Guidance on Demonstrations

A demonstration lasts about 20 minutes. The group of students should aim to spend no more than 10 minutes summarizing what their project is designed to achieve and showing what it currently does achieve. The rest of the time is spent in answering questions.

Note: Students should not attempt to demonstrate on the computer every last thing their program can do. A demonstration of its basic operation plus one or two highlights should suffice.

The mark given for the demonstration is based on the quality and quantity of the work attempted and the final state of achievement.

Students should have their working documents to hand and appropriate reference material, design workings, reasonably up-to-date listings, examples, tests, etc. They are not giving a 20-minute seminar; at least half the time must be available for questions.

Obviously, the kinds of things that are sensibly shown in a demonstration vary from project to project. If students are in doubt as to what to show, they should ask their Supervisors.

The discussion committee consists of two staff members. In general, the supervisor of the project is not present. In general, students should be available and ready to start their demonstrations at least within one week of their submission of the project.

12- Report Standards

- a. The report is a formal written account of the project, satisfying certain standards for inclusion in a library. Students must hand in all relevant work on the project by the end of the 11th week of the second semester. In addition to the report, this includes program listings, discs, detailed logic and wiring lists, etc. It is important to meet this deadline. When students hand this to their supervisors it must be accompanied by a signed version of a form supplied by the GPC. In the case of programming projects, program listings must be submitted in some bound form in an "Auxiliary Appendix" that does not need to satisfy any standard apart from being neat and tidy. It is suggested however that an economical listing would be double-sided on A4.

Here is a suggested structure for a report. Some projects may be rather different from others, and therefore have good reasons for not following these suggestions exactly. Supervisor guidance should anyway be sought!

- Introduction (1st chapter). What is the overall aim of the project. Why is it worth doing? Who will benefit from it? If the overall aim can be split into a number of sub goals, this is a possible place to do it. Finish with a chapter by chapter overview of the rest of the report.
- Background (2nd chapter). Analyze the background to the project. This should mention any previous work, here or elsewhere, and explain its relevance to the project. This could be an appropriate place to justify the choice of platform/software etc. used in the project.
- Description of the student's own work: Design and Implementation (a chapter each). The structure of these chapters may reflect the project lifecycle, but do not write a diary of progress. The design should be clearly described and justified. Supporting diagrams should be used where appropriate and helpful. Keep your design description fairly high level. When describing implementation, confine yourself to the important, difficult, or



- interesting bits. Do not include large chunks of code. Figures may well be useful.
- Results (1 chapter). What is the resulting system like to use. Include screen shots as appropriate.
 - Testing and Evaluation (1 chapter). What testing was done? How confident are student that everything works correctly, and what evidence can they produce to support this claim? Have students evaluated the system against its aims? How did they make this evaluation?
 - Conclusions (last chapter). What conclusions can students draw from the whole project? This should include a clear statement of what has been achieved overall, and will normally continue by suggesting areas of further related work, which could be done.
- b. The report itself (apart from technical considerations) is worth 25% of the project mark. However, it forms the basis of an independent assessment of the project and therefore has greater effect than 25% in practice.
- c. The report must be on paper of A4 size (210 x 297 mm). Only one side of paper should be used except in the Auxiliary Appendix.
- d. The report must be produced using word processing facilities. The body of the report should be suitably divided into chapters and sections. Chapters, sections, pages, figures

and appendices should all be numbered. Chapters, sections and appendices should have a heading. Each chapter should start on a new page. The body of the report should be preceded by a temporary title page, an abstract and a list of contents, and it should be followed by the references and then any appendices.

References to other published work should follow the conventions used in giving references in published work. e.g.: [1] P.J. Denning. Human error and the search for blame, *Communications of the ACM* 33(1): pp 6-7, January 1990. The abstract page must give the title, author, and supervisor, as well as an abstract of the project.

- e. Straightforward and peripheral aspects of the work done should be mentioned only briefly, and description and explanation concentrated on important and interesting aspects. No extra credit is gained by writing a long report and excessive length is detrimental. More detailed description should be placed in appendices to the report. The appendices and/or the Auxiliary Appendix should contain any further documentation. Only the report itself will be held in the Department. Therefore, where important material is not included in it, e.g. because it is not convenient to produce it in A4 format, or it would be too bulky, it may sometimes be appropriate to include extracts in the report.

13- Copyright

In general, it is an infringement of copyright to reproduce any material, except short acknowledged quotations, from a published book or journal without the written permission of the publisher.

Except for the copying of material that is clearly from internal documents of the Department, any copying of books, journals, or documents required for the report should be checked with the supervisor before it is carried out.



Any material that is copied must be acknowledged as such. Attempting to present material written by others as your own is plagiarism and a serious disciplinary offence, as described in the University guidelines in the Undergraduate Handbook.

14- Avoiding Plagiarism

- a. Unacknowledged direct copying from the work of another person, or the close paraphrasing of somebody else's work, is called plagiarism and is a serious offence, equated with cheating in examinations. This applies to copying both from other students' work and from published sources such as books, reports or journal articles.
- b. Paraphrasing, when the original statement is still identifiable and has no acknowledgement, is plagiarism. A close paraphrase of another person's work must have an acknowledgement to the source. It is not acceptable for you to put together unacknowledged passages from the same or from different sources linking these together with a few words or sentences of your own and changing a few words from the original text: this is regarded as over-dependence on other sources, which is a form of plagiarism.
- c. Direct quotations from an earlier piece of your own work, if not attributed, suggest that your work is original, when in fact it is not. The direct copying of one's own writings qualifies as plagiarism if the fact that the work has been or is to be presented elsewhere is not acknowledged.
- d. Plagiarism is a serious offence and will always result in imposition of a penalty. In deciding upon the penalty, the Department will take into account factors such as the year of study, the extent and proportion of the work that has been plagiarized, and the apparent intent of the student. The penalties that can be imposed range from a minimum of a zero mark for the work (without allowing resubmission) through caution to disciplinary measures (such as suspension or expulsion).

15- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
	✓	✓	✓	✓	✓	✓	✓		✓	✓					

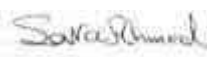
16- Students Evaluation:



No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Class work for Lab. / Tutorial	Weeks 4,7,10,13	40	40%
2	Class work for lecture	week Sixteenth	60	60%

17- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Mikael Berndtsson , Jörgen Hansson Björn Olsson , Björn Lundell, "Thesis Projects A Guide for Students in Computer Science and Information Systems" Second Edition, 2008
	Other References	C. W. Dawson, "The Essence of Computing Projects, A Student's Guide", Prentice Hall 2000.
	Electronic Sources (Links must be added)	https://www.cs.york.ac.uk/projects/howtodo.html
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr/Sarah Ahmed Soliman	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

Course Code: CS 423

Course Name: Intelligent Quantum Computers

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught		Level 4	
Term/ Academic year	Oct.		2025/2026		Credit Hours:		3	
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	BS 102							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator								
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course covers, Concepts of Intelligent computations; Neural Networks; Neurocomputing; Learning laws; Data transformation structures; Fuzzy logic; Genetic algorithms; Optical circuits; Optical computers Quantum computers.

3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1. Understand the fundamental concepts of intelligent computations and neural networks.
- a.2. Comprehend the structure and functionality of neurocomputing and learning laws.
- a.3. Explain data transformation structures and fuzzy logic principles.
- a.4. Evaluate genetic algorithms and their applications.
- a.5. Analyze the principles and technologies behind optical circuits, optical computers, and quantum computers.

CSC 423- Intelligent quantum computers



b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b.1.** Apply theoretical knowledge to solve problems in intelligent computations.
- b.2.** Develop models using neural networks and neurocomputing concepts.
- b.3.** Critically assess the use of fuzzy logic in computational systems.
- b.4.** Synthesize information to develop algorithms for genetic programming.
- b.5.** Evaluate the feasibility and implications of optical and quantum computing.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c.1.** Demonstrate the implementation of neural networks in computing environments.
- c.2.** Experiment with fuzzy logic and genetic algorithms in simulation tools.
- c.3.** Evaluate simple data transformation structures.
- c.4.** Test and analyze the basic functioning of optical circuits.
- c.5.** Design small-scale projects involving quantum computing algorithms.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d.1** Communicate effectively in professional and academic contexts.
- d.2.** Work collaboratively in team settings to achieve objectives.
- d.3.** Manage time and resources efficiently to meet deadlines.
- d.4.** Demonstrate ethical responsibility in professional practices.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1,a2,a3
A6	The current and underlying technologies that support computer processing and inter-computer communication.	a5
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a2,a3,a4
A17	Showing a critical understanding of the principles of artificial intelligence, image, and pattern recognition.	a1,a2,a3
A16	The principles and techniques of several application areas informed by the research directions of the subject, such as artificial intelligence, natural language processing, data mining, databases, and computer graphics.	a1,a2,a3,a4



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Course Specification

B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1,b4,b5
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1,b2,b3
B6	Evaluate the results of tests to investigate the functionality of computer systems.	b2,b3,b4
B12	Perform classifications of (data, results, methods, techniques, algorithms. etc.).	b1,b3
B14	Summarize the proposed solutions and their results.	b1,b4,b5
C2	Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.	c1,c2,c3,c4,c5
C4	Apply computing information retrieval skills in computing community environment and industry.	c1,c2,c4
C6	Design, implement, maintain, and manage software systems.	c1,c2,c5
C14	Specify, design, and implement computer-based systems.	c1,c2,c5
C15	Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.	c3,c4,c5
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning	d3,d1
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d2,d3,d4



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

5- 5.Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
<i>Week -1</i>	Introduction to Intelligent Computations	4	2	-	2	a1,d1
<i>Week-2</i>	Neural Networks	4	2	-	2	a1,b1,c1
<i>Week-3</i>	Neurocomputing Concepts	4	2	-	2	a2,b1,c1
<i>Week-4</i>	Learning Laws	4	2	-	2	a2,b1,l
<i>Week5</i>	Data Transformation Structures	4	2	-	2	a3,c3
<i>Week-6</i>	Fuzzy Logic	4	2	-	2	a1,b2,d2
<i>Week-7</i>	Genetic Algorithms part I	4	2	-	2	a4,b4,c2
<i>Week-8</i>	Midterm Exam					
<i>Week-9</i>	Genetic Algorithms part II	4	2	-	2	a4,b4,c2
<i>Week-10</i>	Optical Circuits	4	2	-	2	a5,c4
<i>Week-11</i>	Optical Computers	4	2	-	2	a5,b5,d2
<i>Week-12</i>	Quantum Computing Basics	4	2	-	2	a5,c5,d3
<i>Week-13</i>	Advanced Quantum Computing	4	2	-	2	b5,d4
<i>Week-14</i>	Lab exam					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√			√	√		√	√					

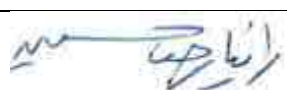
7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	10	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam		0	0
7	Assignments / Project	weekly	0	0
8	Field training		0	0
9	Other (Mention)		0	0



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Nielsen, M. A. & Chuang, I. L. (2020). Quantum Computation and Quantum Information (10th Anniversary Edition)
	Other References	Flaherty, E., & Schumacher, M. (2019). <i>Fuzzy Logic and Its Applications: From Neural Networks to Genetic Algorithms</i>. Academic Press. Russell, S., & Norvig, P. (2020). <i>Artificial Intelligence: A Modern Approach (4th ed.)</i>. Pearson. Nielsen, M. A. (2020). <i>Neural Networks and Deep Learning: A Textbook</i>. Springer. Goodfellow, I., Bengio, Y., & Courville, A. (2018). <i>Deep Learning</i>. MIT Press.
	Electronic Sources (Links must be added)	IBM Quantum Platform
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name		Dr. Rania Ragab Hussien
Signature		



Course Code: CS 424

Course Name: Bioinformatics Systems

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 4		
Term/ Academic year	Oct.	2025/2026			Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 304							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Rania Ragab Hussien 					
Course Specification Approval			Department Council					
Course Specification Approval Date			02/8/0202					

2. Course Overview:

This course an overview, biological background related to bioinformatics -the genome, protein and motif databases – DNA replication-motifs finding algorithms- local and global pairwise sequence alignment – scoring matrices - introduction to multiple sequence alignment – genome assembly algorithms – microarray gene expression databases- applications on microarrays datasets- genome compression.

4- Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

CS 424- Bioinformatics Systems



- a1. Understand the biological background related to bioinformatics, including the structure and function of genomes, proteins, and motifs.
- a2. Gain familiarity with various biological databases (e.g., genome, protein, motif databases) and their role in bioinformatics research.
- a3. Comprehend the principles of DNA replication and the methods used for sequence alignment (local, global, and multiple).
- a4. Understand the use of scoring matrices (e.g., PAM, BLOSUM) in sequence alignment and their role in determining sequence similarity.
- a5. Learn the fundamentals of genome assembly algorithms and their applications in modern genomics research.
- a6. Understand microarray gene expression data, gene expression profiling, and how to analyze microarray datasets for biological research.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Apply bioinformatics algorithms for motif finding, sequence alignment, and genome assembly to solve biological problems.
- b2. Develop problem-solving strategies using bioinformatics tools and techniques for data analysis and interpretation in genomic studies.
- b3. Analyze and interpret biological data from microarray gene expression databases and sequence alignment outputs.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Effectively use bioinformatics databases and tools for searching, retrieving, and analyzing genomic and protein data.
- c2. Utilize bioinformatics software for sequence alignment (e.g., BLAST, ClustalW), genome assembly, and microarray data analysis.
- c3. Implement motif-finding algorithms and genome compression techniques in practical bioinformatics tasks.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Develop critical thinking and analytical skills for evaluating bioinformatics results and making informed decisions based on data.
- d2. Work effectively in teams on bioinformatics projects, integrating biological and computational knowledge for collaborative problem-solving.
- d3. Present bioinformatics findings clearly in both written and oral forms, making complex data comprehensible to both scientific and non-scientific audiences.



4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a2,a3,a4,a5,a6
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development.	a1,a3
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a3,a4,a6
A10	Current developments in computing and information research.	a1,a3
A16	The principles and techniques of several application areas informed by the research directions of the subject, such as artificial intelligence, natural language processing, data mining, databases, and computer graphics.	a2,a5,a6
A19	Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing.	a5,a6
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b1,b2
B7	Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact	b2,b3
B15	Restrict solution methodologies upon their results.	b1,b3
C6	Design, implement, maintain, and manage software systems.	c2,c3
C8	Handle a mass of diverse data, assess risk and draw conclusions.	c1,c2,c3
C14	Specify, design, and implement computer-based systems.	c2,c3
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d2
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d3



5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs.			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	The Genome	4	2	0	2	all
Week-2	Protein and Motif Databases	4	2	0	2	all
Week-3	DNA Replication	4	2	0	2	all
Week-4	Motif-Finding Algorithms	4	2	0	2	all
Week5	Local and Global Pairwise Sequence Alignment	4	2	0	2	all
Week-6	Scoring Matrices (PAM, BLOSUM)	4	2	0	2	all
Week-7	Introduction to Multiple Sequence Alignment (MSA)	4	2	0	2	all
Week-8	Midterm Exam.					
Week-9	Genome Assembly Algorithms	4	2	0	2	all
Week-10	Microarray Gene Expression Databases	4	2	0	2	all
Week-11	Applications on Microarray Datasets	4	2	0	2	all
Week-12	Genome Compression	4	2	0	2	all
Week-13	Genome Compression	4	2	0	2	all
Week-14	Practical lab examination	4	2	0	2	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓		✓	✓					

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	9	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	13	12	10%
6	Final Oral Exam		0	
7	Assignments / Project	weekly	0	
8	Field training		0	
9	Other (Mention)		0	



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	- "Bioinformatics: Sequence and Genome Analysis" by David W. Mount - "Bioinformatics: Principles and Applications" by R. S. K. Ghosh and P. R. Ghosh - "Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins" by Andreas D.
	Other References	None
	Electronic Sources (Links must be added)	- NCBI (National Center for Biotechnology Information): NCBI - UniProt (Universal Protein Resource): UniProt - Ensembl Genome Browser: Ensembl - Galaxy Project: Galaxy
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

Course Code: CS 400

Course Name: Selected Topics in computer science level 4

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 4		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	-----							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator								
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course is intended to cover trending topics not covered by the other courses specified herein. Its syllabus and prerequisite are to be specified by the course instructor and must get approval by both the department and institute councils.



3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

a.1

a.2

b. Intellectual skills:

On successful completion of the courses, students should be able to:

b.1

b.2

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

c.1

c.2

d. General and transferable skills:

On successful completion of the courses, students should be able to:

d.1

d.2

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1		a1,a2
A2		a1,a3
A3		
B1		b1,b2,b3
C1		c1,c3,c4



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1						
Week-2						
Week-3						
Week-4						
Week5						
Week-6						
Week-7						
Week-8	Midterm Exam.					
Week-9						
Week-10						
Week-11						
Week-12						
Week-13						
Week-14						

Course code- Course name



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓															

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	8	5	5%
3	Midterm exam	7	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam		0	
7	Assignments / Project	weekly	10	10%
8	Field training		0	
9	Other (Mention)		0	



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	
	Other References	
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name		Dr. Rania Ragab Hussien
Signature		



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

Course Code: CS 420

Course Name: Parallel Processing

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 4		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 301							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Mona Mohamed Fouad 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course will cover a range of topics involved in designing and programming parallel architectures. The course focuses on the most common type of parallel machines: shared and distributed memory multi-processor systems. The course will also cover other parallel machines and programming paradigms including dataflow, vector processing, transactional

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a.1 Understand the core concepts and principles of parallel architectures, including shared and distributed memory systems.
- a.2 Describe the Tools, practices and methodologies used in the specification,



design, implementation, and evaluation of parallel programming.

- a.3 Describe principles of generating tests which investigate the functionality of writing and running parallel programs and evaluating their results.
- a.4 Specify high-level programming languages used in parallel programming.
- a.5 Retrieve the fundamental topics parallel processing design.
- a.6 Describe the aspects of a parallel sorting algorithm.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Define concepts, principles, theories and practices behind parallel programming as an academic discipline.
- b2. Evaluate the results of tests to investigate the functionality of parallel programming system. b3. Compare performance evaluation of MPI Programs.
- b4. Highlight parallel programs and verify solutions.
- b5. Identify a range of parallel programming solutions and critically evaluate and justify proposed design solutions.
- b6. Evaluate parallel programming problems with pressing commercial or industrial constraints

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Develop an understanding of transactional memory and describe its role in simplifying concurrent programming by ensuring atomicity of operations.
- c2. Apply parallel programming techniques to solve real-world problems.
- c3. Design and implement parallel programs using various programming paradigms, including OpenMP, MPI, and multithreading, to solve computational problems efficiently.
- c4. Evaluate the performance of parallel programs and architectures, using metrics like speedup, scalability, and efficiency, to identify and optimize bottlenecks.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Demonstrating the ability to make use of a range of parallel programming learning resources and to manage one's own learning.
- d2. Show the use of parallel programming.



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Computer Science Department

Course Specification

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1,a3
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a2
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a3,a2
A13	Using of high-level programming languages.	a4
A18	The fundamental topics in Computer Science, including hardware and software architectures, software engineering principles and methodologies, operating systems, compilers, parallel and distributed computing, systems, and software tools.	a1,a5
A19	Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing.	a5,a6
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b1
B6	Evaluate the results of tests to investigate the functionality of computer systems	b2
B11	Evaluate the results of tests to investigate the functionality of computer systems	b3
B16	Establish criteria and verify solutions.	b4
17	Identify a range of solutions and critically evaluate and justify proposed design solutions.	b5
18	Solve computer science problems with pressing commercial or industrial constraints.	b6
C6	Design, implement, maintain, and manage software systems.	c3
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c3
C14	Specify, design, and implement computer-based systems.	c2,c3
C15	Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.	c4
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1
D7	Show the use of general computing facilities.	d2

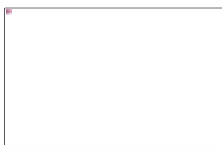


Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

5. Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
<i>Week-1</i>	Introduction to Parallel Architectures • Overview of parallel computing • Comparison of parallel and sequential computing • Introduction to shared and distributed memory systems	4	2	-	2	a1, a2
<i>Week-2</i>	Shared Memory Multi-Processor Systems	4	2	-	2	a1, a2, a3, a5, b1, b2
<i>Week-3</i>	Distributed Memory Multi-Processor Systems	4	2	-	2	a1, a3, a5, b1,b2, d1
<i>Week-4</i>	Message passing interface (MPI) programming model	4	2	-	2	a4, a5, b3, c2, c3, d2
<i>Week5</i>	Load balancing and data distribution strategies	4	2	-	2	a4, a5, b3, c2, c3, d2
<i>Week-6</i>	Dataflow Architectures	4	2	-	2	a3, a5, a6, b1, b4, c1, c2, c3, d1, d2
<i>Week-7</i>	Vector Processing: Introduction to vector processors and SIMD (Single Instruction, Multiple Data)	4	2	-	2	a4, a5, b3,b4, b5, c2, c3, c4,d2
<i>Week-8</i>	Midterm Exam					
<i>Week-9</i>	• Concept of transactional memory and its advantages over traditional locks • Programming for transactional memory systems	4	2	-	2	a2, a4, a6, b1,b4, b5, b6,c1, c2, c3, c4,d2
<i>Week-10</i>	Multithreaded Architectures	4	2	-	2	a4, a6, b1,b4, b5, b6,c1, c2, c3, c4
<i>Week-11</i>	Thread management and scheduling	4	2	-	2	a6, b1,b4, b5, b6,c1, c2, c3, c4
<i>Week-12</i>	Parallel Programming Languages and Tools (OpenMP, MPI, CUDA)	4	2	-	2	b3, b5, b6,c1, c2, c3, c4
<i>Week-13</i>	Programming Paradigms for Parallel Architectures	4	2	-	2	b3, b5, b6,c1, c2, c3, c4
<i>Week-14</i>	LAB AND ORAL EXAM	4	2	-	2	



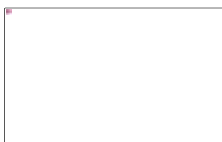
Higher Technological Institute (HTI)
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Course Specification

5- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓	✓											

7- Students Evaluation:

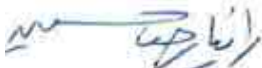
No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	9	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	0
6	Final Oral Exam		0	0
7	Assignments / Project	weekly	10	10%
8	Field training		0	0
9	Other (Mention)		0	0



Higher Technological Institute (HTI)
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Course Specification

8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	"HitFlow: A Dataflow Programming Model for Hybrid Distributed- and Shared- Memory Systems" (2021)
	Other References	Peter S. Pacheco, Matthew Malensek, "An Introduction to Parallel Programming", 2 nd edition, Elsevier , 2021.
	Electronic Sources (Links must be added)	None
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Mona Mohamed Fouad	Dr. Rania Ragab Hussien
Signature		



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Computer Science Department**

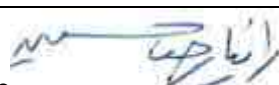
Course Specification

Course Code: CS 421

Course Name: Computer Vision Systems

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 4		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 103							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Rania Ragab Hussien 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

The aim of this course is to introduce the principles, models and applications of computer vision, as well as some mechanisms used in biological visual systems that may inspire design of artificial ones. The course will cover image formation, structure, and coding; edge and feature detection; neural operators for image analysis; texture, color, stereo, and motion; wavelet methods for visual coding and analysis; interpretation of surfaces, solids, and shapes; data fusion; probabilistic classifiers; visual inference and learning.



3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a1. Understand the fundamental principles, models, and applications of computer vision.
- a2. Recognize the biological mechanisms of visual systems that inspire the design of artificial vision systems.
- a3. Comprehend image formation, structure, and coding techniques and their relevance to real-world computer vision applications.
- a4. Understand edge and feature detection techniques and their importance in object recognition and image analysis.
- a5. Gain knowledge of neural operators used for image analysis and deep learning-based methods for computer vision tasks.
- a6. Develop an understanding of texture, color, stereo vision, and motion analysis in visual data.
- a7. Learn wavelet-based methods for image coding and visual analysis.
- a8. Understand techniques for interpreting and reconstructing surfaces, solids, and shapes from image data.
- a9. Gain insights into data fusion techniques for integrating multiple visual information sources.
- a10. Comprehend probabilistic classifiers used in computer vision and apply them to classification tasks.
- a11. Learn about visual inference and machine learning methods used for pattern recognition and visual learning.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Critically evaluate and compare various algorithms used for image processing, edge detection, and feature extraction.
- b2. Analyze and interpret the results of image analysis techniques such as texture, motion, and shape detection.
- b3. Apply machine learning techniques (e.g., probabilistic classifiers, neural networks) to solve complex vision problems.
- b4. Develop strategies for optimizing image processing algorithms and evaluating their effectiveness in real-world applications.
- b5. Synthesize knowledge from multiple areas of computer vision (e.g., texture analysis, motion detection, data fusion) to develop solutions for complex visual tasks.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Implement image processing techniques such as edge detection, feature extraction, and neural operators using programming languages (e.g., Python, MATLAB).



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- c2. Apply wavelet-based methods to visual coding and analyze image data using modern software tools.
- c3. Use machine learning algorithms (e.g., convolutional neural networks, probabilistic classifiers) for real-time image recognition and pattern detection.
- c4. Design and implement practical computer vision systems that integrate various techniques (e.g., stereo vision, motion detection, shape interpretation) for applications in industries such as robotics, medical imaging, and autonomous systems.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Develop problem-solving skills through the application of computer vision techniques in various domains.
- d2. Enhance project management skills by working on group projects and hands-on labs that require collaborative efforts.
- d3. Strengthen coding and technical skills through real-world programming assignments and projects.
- d4. Communicate technical concepts clearly and effectively in both written reports and presentations.
- d5. Develop the ability to independently learn and stay up to date with emerging trends and technologies in the rapidly evolving field of computer vision.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a4,a8,a9,a11
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a1,a8,a9
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development	a10,a11
A6	The current and underlying technologies that support computer processing and inter-computer communication.	a1,a3,a7,a8
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a4,a10



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A8.	Management and economics principles relevant to computing and information disciplines.	a2,a6
A9.	Professional, moral, and ethical issues involved in the exploitation of computer technology and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.	a2,a3,a6
A15.	Interpreting and analyzing data qualitatively and/or quantitatively.	a6,a7,a10
A16.	The principles and techniques of several application areas informed by the research directions of the subject, such as artificial intelligence, natural language processing, data mining, databases, and computer graphics.	a5,a6,a7,a11
A17.	Showing a critical understanding of the principles of artificial intelligence, image, and pattern recognition.	a2,a4,a5,a10,a11
A19	Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing.	a5,a6,a7,a8,a9,a11
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.	b2,b4
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b4,b5
B10	Define traditional and nontraditional problems, set goals towards solving them, and. observes results.	b5
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b1,b3
B15	Restrict solution methodologies upon their results.	b4
C4	Apply computing information retrieval skills in computing community environment and industry.	c2,c4
C6	Design, implement, maintain, and manage software systems.	c1,c3,c4
C8	Handle a mass of diverse data, assess risk and draw conclusions.	c2,c3



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Course Specification

C14	Specify, design, and implement computer-based systems.	c4
D3	Show the use of information-retrieval.	d5
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d4
D5	Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension.	d1,d3
D7	Show the use of general computing facilities.	d2
D8	Demonstrate an appreciation of the need to continue professional development in recognition of the requirement for life-long learning.	d1,d2



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Computer Science Department

Course Specification

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs.</i>			ILOs Covered by Course
			Lec.	Tut.	Lab.	
<i>Week -1</i>	Introduction to Computer Vision	4	2	0	2	a1, a2, b1, c1, d1
Week-2	Image Formation	4	2	0	2	a3, b2, c2, d2
Week-3	Edge and Feature Detection	4	2	0	2	a1, b1, b3, c1, c3, d3
Week-4	Neural Operators for Image Analysis	4	2	0	2	a2, b2, c1, d1
Week5	Texture, Color, Stereo, and Motion	4	2	0	2	a1, a2, b1, b2, c1, c2, d1
Week-6	Wavelet Methods for Visual Coding and Analysis	4	2	0	2	a1, b2, c1, d3
Week-7	Interpretation of Surfaces, Solids, and Shapes	4	2	0	2	a1, a2, b3, c1, d2
Week-8	Midterm Exam.					
Week-9	Data Fusion	4	2	0	2	a1, b1, b3, c2, d3
Week-10	Probabilistic Classifiers	4	2	0	2	a2, b2, b3, c2, c3, d2
Week-11	Visual Inference and Learning	4	2	0	2	a2, a3, b3, c2, c3, d2
Week-12	Biological Visual Systems Inspiration	4	2	0	2	a1, a3, b1, b3, c2, c3, d1, d3
Week-13	Biological Visual Systems Inspiration	4	2	0	2	a1, a2, a6, b1, b4, c1, c5, d2, d5
Week-14	Lab Examination	4	2	0	2	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology-Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓		✓	✓					

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	9	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	
7	Assignments / Project	weekly	10	10%
8	Field training	-	0	
9	Other (Mention)	-	0	



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	- "Computer Vision: Algorithms and Applications" by David L. Poelman and Michael D. Abidi - "Multiple View Geometry in Computer Vision" by Richard Hartley and Andrew Zisserman - "Digital Image Processing" by Rafael C. Gonzalez and Richard E. Woods - "Pattern Recognition and Machine Learning" by Christopher M. Bishop
	Other References	- "Deep Learning for Computer Vision" by Rajalingappaa Shanmugamani - "Wavelet Methods for Time Series Analysis" by Donald B. Percival and Andrew T. Walden
	Electronic Sources (Links must be added)	None
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



**Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department**

Course Specification

Course Code: CS 422

Course Name: Genetic Algorithms

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 4		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 304							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Rania RagabHussien 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course covers, evolutionary programming, basic genetic algorithms, populations, fitness evaluation, objective functions, cross-over, mutation, strategies for replacement, schema theory, game playing: prisoners dilemma, gray code, floating point representation, integer representation, non-uniform mutation.

3-Intended Learning Outcomes (ILOs)

a.Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a1. Understanding the fundamentals of evolutionary programming, including its history and primary algorithms.
- a2. Explain the key components of genetic algorithms, including selection, crossover, and mutation.



- a3. Describe and implement various cross-over techniques in genetic algorithms.
- a4. Explain different mutation techniques, including non-uniform mutation, in genetic algorithms.
- a5. Explain schema theory and its relevance to genetic algorithms.
- a6. Describe the fundamentals of game theory and the Prisoner's Dilemma.
- a7. Describe techniques for floating point representation in genetic algorithms.

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Analyze the impact of cross-over methods on genetic diversity and solution quality.
- b2. Assess the impact of replacement strategies on algorithm performance and convergence.
- b3. Analyze the effectiveness of non-uniform mutation in enhancing algorithm performance and exploration.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Manage population parameters to improve algorithm performance.
- c2. Apply schema theory concepts to understand and improve the performance of genetic algorithms.
- c3. Apply evolutionary strategies to game theory problems and analyze the outcomes.
- c4. Apply integer representation techniques to solve combinatorial optimization problems.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Implement evolutionary programming algorithms to solve optimization problems.
- d2. Develop and apply basic genetic algorithms to address various optimizations.
- d3. Evaluate and refine objective functions to enhance the performance of genetic algorithms.
- d4. Evaluate the effects of mutation strategies on convergence and diversity in genetic algorithms.
- d5. Implement Gray code to improve encoding and reduce errors in genetic algorithms.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A10	Current developments in computing and information research.	a1,a2
A8	Management and economics principles relevant to computing and information disciplines.	a1,a3
A9	Professional, moral, and ethical issues involved in the exploitation of computer technology and be guided by the appropriate professional,	a5,a6



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	ethical and legal practices relevant to the computing and information industry.	
A15	Interpreting and analyzing data qualitatively and/or quantitatively.	a3,a4,a6
A16	The principles and techniques of several application areas informed by the research directions of the subject, such as artificial intelligence, natural language processing, data mining, databases, and computer graphics.	a1,a2,a5,a6
A17	Showing a critical understanding of the principles of artificial intelligence, image, and pattern recognition.	a1,a2,a5
A19	Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing.	a1,a6
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution.	b1,b2
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b3
B15	Restrict solution methodologies upon their results.	b2,b3
C4	Apply computing information retrieval skills in computing community environment and industry.	c3,c4
C6	Design, implement, maintain, and manage software systems.	c1,c2,c3,c4
C8	Handle a mass of diverse data, assess risk and draw conclusions.	c1,c3,c4
C14	Specify, design, and implement computer-based systems.	c1,c2,c3,c4
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1,d2,d5
D3	Show the use of information-retrieval.	d1,d2,d5
D4	Use an appropriate mix of tools and aids in preparing and presenting reports for a range of audiences, including management, technical, users, industry, or the academic community.	d3,d4
D7	Show the use of general computing facilities.	d1,d2,d5



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5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs.</i>			ILOs Covered by Course
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
<i>Week -1</i>	Introduction to Evolutionary Programming	4	2	0	2	a1, a2, b1, c1, d1
Week-2	Basic Genetic Algorithms (GA)	4	2	0	2	a3, b2, c2, d2
Week-3	Populations and Fitness Evaluation	4	2	0	2	a1, b1, b3, c1, c3, d3
Week-4	Objective Functions	4	2	0	2	a2, b2, c1, d1
Week5	Crossover Mechanisms	4	2	0	2	a1, a2, b1, b2, c1, c2, d1
Week-6	Mutation Strategies	4	2	0	2	a1, b2, c1, d3
Week-7	Replacement Strategies	4	2	0	2	a1, a2, b3, c1, d2
Week-8	Midterm Exam.					
Week-9	Schema Theory	4	2	0	2	a1, b1, b3, c2, d3
Week-10	Game Playing	4	2	0	2	a2, b2, b3, c2, c3, d2
Week-11	Gray Code	4	2	0	2	a2, a3, b3, c2, c3, d2
Week-12	Floating Point and Integer Representation	4	2	0	2	a1, a3, b1, b3, c2, c3, d1, d3
Week-13	Non-uniform Mutation	4	2	0	2	a1, a2, a6, b1, b4, c1, c5, d2, d5



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
√	√	√	√		√	√	√		√	√					

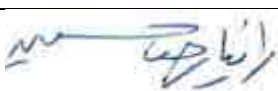
7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	9	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10%
6	Final Oral Exam	-	0	0
7	Assignments / Project	weekly	0	0
8	Field training	-	0	0
9	Other (Mention)	-	0	0



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	“Introduction to Genetic Algorithms” Author: Melanie Mitchell “Genetic Algorithms in Search, Optimization, and Machine Learning” Author: David E. Goldberg “Evolutionary Computation: A Unified Approach” Author: Kenneth A. De Jong “An Introduction to Evolutionary Computation” Authors: Agoston E. Eiben and James E. Smith
	Other References	None
	Electronic Sources (Links must be added)	Genetic Algorithms - MIT OpenCourseWare -Evolutionary Algorithms - Wikipedia -Gray Code - Wikipedia -Floating Point Arithmetic - IEEE
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Rania Ragab Hussien	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)
Computer Science Department
Course Specification

Course Code: CS 302

Course Name: Web Programming

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Compulsory				Academic level at which the course is taught	Level 4		
Term/ Academic year	Choose an item.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 102							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Mona Mohamed Fouad 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course includes an introduction to the use of Internet services and the fundamentals of web page design and web site development. Topics include basic HTML/CSS/JavaScript, Client/Server programming, Server-side controls, Brief overview of PHP with database applications. Basic XML/XSL, N-tier application architecture, Sessions and state management, Security for web applications, Web services.

3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a1. Define concepts of web developing.
- a2. Recognize modeling and design of web applications bearing in mind the trade-offs.
- a3. Define tools, practices and methodologies used in developing web application.
- a4. Describe the principals of generating tests which investigate the functionality of web application and evaluating their results.
- a5. Recognize current development in web developing.



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b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Analyze web applications problems and provide solutions related to the design and construction of web application
- b2. Recommend new ideas and designs using rational and reasoned arguments for presentation of web applications.
- b3. Evaluate the results of tests to investigate the functionality of web application.
- b4. Identify judgments considering balanced costs, benefits of web application.
- b5. Express legal, moral, and ethical issues relevant to web application.
- b6. Distinguish attributes, components, relationships, patterns, main ideas, and errors related to web application.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:

- c1. Deploy the tools used for the building, maintenance, and documentation of web application.
- c2. Develop, Design, implement, maintain, and manage web application.
- c3. Assess the implications, risks or safety aspects involved in the operation of web application.
- c4. Use appropriate programming languages and database system when developing web application.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Demonstrating the ability to make use of a range of learning resources and to manage one's own learning in web developing.
- d2. Show the use of general computing facilities when developing web applications.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1
A2	Modeling and design of computer-based systems bearing in mind the trade-offs.	a2
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a3
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a3,a4



B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1
B5	Make ideas, proposals and designs using rational and reasoned arguments for presentation of computing systems.	b2
B6	Evaluate the results of tests to investigate the functionality of computer systems.	b3
B7	Achieve judgments considering balanced costs, benefits, safety, quality, reliability, and environmental impact	b4
B8	Familiar with the professional, legal, moral, and ethical issues relevant to the computing industry.	b5
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b6
C3	Deploy the equipment and tools used for the construction, maintenance, and documentation of computer applications.	c1,c2
C6	Design, implement, maintain, and manage software systems.	c1,c3,c4
C7	Assess the implications, risks or safety aspects involved in the operation of computing equipment within a specific context.	c3
C9	Use appropriate programming languages, web-based systems and tools, design methodologies, and knowledge and database systems.	c4
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1
D7	Show the use of general computing facilities.	d2



5- Course Schedule:

Week No.	Topic	Total Hours	Contact hrs			ILOs Covered by Course
			Lec.	Tut.	Lab.	
Week -1	Introduction to HTML and Web Pages	4	2	0	2	a1,a3,a4,b2,b6,c1,d1
Week-2	Images, Tables, Background and Forms.	4	2	0	2	a1,a3,a4,b2,b6,c1,d1
Week-3	Cascading Style Sheets and Color Scheme	4	2	0	2	a2,a3,b2,b6,c1,c2,d1,d2
Week-4	Cascading Style Sheets – Block Level	4	2	0	2	a2,a3,b2,b6,c1,c2,d1,d2
Week5	Introduction to JavaScript	4	2	0	2	a1,b2,b6,c1,c2,c3,d1,d2
Week-6	Processing HTML Forms	4	2	0	2	a2,a4,b6,c1,c2,c4,d1,d2
Week-7	Conditions and Math Objects	4	2	0	2	a2,a4,a5,b3,b6,d1,d2
Week-8	Midterm Exam.					
Week-9	Loops, Arrays, Return Functions, Time Object, and Image Roller	4	2	0	2	a3,b2,c2,c4,d1,d2
Week-10	Introduction to PHP: Hypertext Preprocesso	4	2	0	2	a3,b2,c2,c4,d1,d2
Week-11	Validating Forms and Loops	4	2	0	2	a4,b3,c2,c3,d1,d2
Week-12	Accessing Relational Database using MySQL and Working with Database Result Sets	4	2	0	2	a2,a3,a5,b2,b6,c1,c2,c4,d1,d2
Week-13	Interactive Pages: Searching and Updates with forms	4	2	0	2	a2,a3,a5,b2,b6,c1,c2,c4,d1,d2
Week-14	Practical lab examination					



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓				✓	✓			✓					

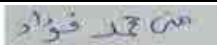
7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	4	10	10 %
2	Quiz 2 written (Semester work)		0	
3	Midterm exam	8	10	10 %
4	Final Written Exam	15&16	60	60 %
5	Final Practical Exam	14	10	10 %
6	Final Oral Exam		0	
7	Assignments / Project	weekly	10	10 %
8	Field training		0	
9	Other (Mention)		0	



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	Web Security for Developers" by Malcolm McDonald (2021)
	Other References	None
	Electronic Sources (Links must be added)	None
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Mona Mohamed Fouad	Dr. Rania Ragab Hussien
Signature		



Higher Technological Institute (HTI)-10th of Ramadan City
Computer Science Department

Course Specification

Course Code: CS 442

Course Name: Data Communications

Department participating in delivery of the course	Computer Science

1. Basic Information:

Course Type	Elective				Academic level at which the course is taught	Level 4		
Term/ Academic year	Oct.		2025/2026		Credit Hours:	3		
Contact Hours	Lecture:	2	Tutorial:	-	Lab.:	2	Total	4
Pre-Requisite	CS 310							
Academic standards			NARS 2010					
Bylaw Approval			2022					
Course Coordinator			Dr. Mona Mohamed Fouad 					
Course Specification Approval			Department Council					
Course Specification Approval Date			20/8/2025					

2. Course Overview:

This course covers the basics of digital communications and local area networks. The topics studied include data transmission, transmission media, signal encoding techniques, error detection and correction, data compression, ARQ protocols, ALOHA protocol, and Ethernet. Topics include multiplexing, spread spectrum, switching, and routing algorithms

3-Intended Learning Outcomes (ILOs)

a. Knowledge and understanding:

On successful completion of the courses, students should be able to:

- a1. Explain the fundamental principles of digital communication systems and local area networks.
- a2. Describe the process of data transmission and the role of various transmission media in communication systems.
- a3. Identify and explain different signal encoding techniques used in digital communications.

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- a4. Understand the concepts of error detection and correction in data transmission and their importance in maintaining data integrity.
- a5. Explain the principles of data compression and its significance inefficient data transmission.
- a6. Describe the operation and application of Automatic Repeat reQuest (ARQ) protocols in ensuring reliable data transfer.
- a7. Understand the ALOHA protocol and its role in the development of random access methods for shared communication channels.
- a8. Explain the principles and operation of Ethernet technology in local area networks.
- a9. Describe various multiplexing techniques (e.g., time-division, frequency-division) and their applications in communication systems.
- a10. Understand the concept of spread spectrum technology and its advantages in wireless communications.
- a11. Explain the basic principles of switching in communication networks, including circuit switching and packet switching.
- a12. Identify the key components of a local area network and explain their functions.
- a13. Explain the concept of network topology and describe common LAN topologies (e.g., bus, star, ring).

b. Intellectual skills:

On successful completion of the courses, students should be able to:

- b1. Analyze digital communication systems and local area networks to identify their components and understand their interrelationships.
- b2. Evaluate the suitability of different transmission media for various communication scenarios based on their characteristics and limitations.
- b3. Compare and contrast various signal encoding techniques, assessing their advantages and disadvantages in different applications.
- b4. Critically analyze error detection and correction methods to determine their effectiveness in maintaining data integrity under different conditions.
- b5 Synthesize knowledge of ARQ protocols to design effective error control strategies for reliable data transfer.
- b6. Evaluate the performance of the ALOHA protocol and its variants in random access communication scenarios.
- b7. Analyze Ethernet technology and its evolution to understand its dominance in local area networking.
- b8. Compare different multiplexing techniques and determine their appropriate applications in communication systems.
- b9. Evaluate emerging trends and technologies in digital communications and networking to assess their potential impact on future systems.
- b10. Apply theoretical knowledge to solve practical problems related to network design and optimization.

c. Professional and practical skills:

On successful completion of the courses, students should be able to:



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- c1. Configure and set up basic digital communication systems and local area networks using industry-standard equipment and software.
- c2. Implement various signal encoding techniques in software or hardware simulations to observe their effects on data transmission.
- c3. Design and implement error detection and correction algorithms in programming languages commonly used in network applications.
- c4. Implement and analyze the performance of ALOHA and slotted ALOHA protocols using simulation tools.

d. General and transferable skills:

On successful completion of the courses, students should be able to:

- d1. Communicate complex technical concepts related to digital communications and networking effectively, both orally and in writing, to diverse audiences.
- d2. Collaborate effectively in multidisciplinary teams to solve network design and implementation challenges.
- d3. Apply critical thinking and problem-solving skills to troubleshoot network issues and optimize system performance.

4- Contribution in the Program ILO

Matrix of intended learning outcomes ILOs with program outcomes POs.

Program ILOs		Course ILOs
Code	Text	
A1	Essential facts, concepts, principles, and theories relating to computing and information and computer applications as appropriate to the program of study.	a1, a2, a3, a4
A3	Tools, practices, and methodologies used in the specification, design, implementation and evaluation of computer software systems.	a6, a7
A4	Criteria and specifications appropriate to specific problems, and plan strategies for their solution.	a8, a9, a10
A5	The extent to which a computer-based system meets the criteria defined for its current use and future development.	a12, a13
A6	The current and underlying technologies that support computer processing and inter-computer communication.	a4, a5, a6
A7	Principals of generating tests which investigate the functionality of computer programs and computer systems and evaluating their results.	a7
A8	Management and economics principles relevant to computing and information disciplines	a8
A9	Professional, moral, and ethical issues involved in the exploitation of computer technology and be guided by the appropriate professional, ethical and legal practices relevant to the computing and information industry.	a9
A10	Current developments in computing and information research.	a10



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A14	Demonstrating basic knowledge and understanding of a core of analysis, algebra, applied mathematics and statistics.	a8, a9, a10
A15	Interpreting and analyzing data qualitatively and/or quantitatively.	a12, a13
A18	The fundamental topics in Computer Science, including hardware and software architectures, software engineering principles and methodologies, operating systems, compilers, parallel and distributed computing, systems, and software tools.	a8, a9, a10
A19	Selecting advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing.	a12, a13
B1	Analyze computing problems and provide solutions related to the design and construction of computing systems.	b1, b2, b3
B2	Realize the concepts, principles, theories and practices behind computing and information as an academic discipline.	b4, b5, b6
B3	Identify criteria to measure and interpret the appropriateness of a computer system for its current deployment and future evolution	b7, b8
B4	Analyze, propose and evaluate alternative computer systems and processes taking into account limitations, and quality constraints.	b9, b10
B9	Evaluate research papers in a range of knowledge areas	b2, b8
B11	Perform comparisons between (algorithms, methods, techniques...etc.).	b6, b7
B13	Identify attributes, components, relationships, patterns, main ideas, and errors.	b9
B16	Establish criteria and verify solutions.	b4, b5
B17	Identify a range of solutions and critically evaluate and justify proposed design solutions.	b10
B19	Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.	b3, b8, b9
C3	Deploy the equipment and tools used for the construction, maintenance, and documentation of computer applications.	c3
C8	Handle a mass of diverse data, assess risk and draw conclusions.	c2
C10	Communicate effectively by oral, written, and visual means.	c1
C18	Apply and manage the need for continuing professional and practical development in recognition of the need for life long-learning.	c4
D1	Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.	d1
D2	Demonstrate skills in group working, team management, time management and organizational skills.	d2



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Computer Science Department**

Course Specification

D6	Reveal communication skills, public speaking and presentation skills, and delegation, writing skills, oral delivery, and effectively using various media for a variety of audiences.	d3

5- Course Schedule:

<i>Week No.</i>	<i>Topic</i>	<i>Total Hours</i>	<i>Contact hrs</i>			<i>ILOs Covered by Course</i>
			<i>Lec.</i>	<i>Tut.</i>	<i>Lab.</i>	
Week -1	Introduction to Digital Communications	4	2	0	2	a1,a2,b1,b9
Week-2	Data Transmission Fundamentals	4	2	0	2	a1,a2,b1,b9
Week-3	Transmission Media	4	2	0	2	a1,a2,b1,b9,b10
Week-4	Signal Encoding Techniques	4	2	0	2	a3,b3,c2,d1
Week5	Error Detection and Correction	4	2	0	2	a4,b1,b2,b4,c1,c3,d1,d2
Week-6	ARQ Protocols	4	2	0	2	a6,b5,c1,d1,d2
Week-7	ALOHA Protocol	4	2	0	2	a7,b6,c1,c4,d1,d2,d3
Week-8	Midterm Exam.					
Week-9	Ethernet	4	2	0	2	a8,b7,d2
Week-10	Multiplexing Techniques	4	2	0	2	a9,b8,d2,d3
Week-11	Spread Spectrum Technologies	4	2	0	2	a10,b9,b10,d2,d3
Week-12	Switching Techniques	4	2	0	2	a10,b9,b10,d2,d3
Week-13	Introduction to Local Area Networks (LANs)	4	2	0	2	a12,a13,b9,b10,d1,d2,d3
Week-14	Practical lab examination	4	2	0	2	



6- Teaching and Learning and Assessment methods:

Direct Instruction		Indirect Instruction										Information Technology- Assisted Learning			
Lectures	Tutorial / Practical	Brain Storming	Project based learning	Case Study	Problem Base Learning	Reports & Research	Discussion	Field Training	Site Visit	Self-Learning	Discovery Learning	Simulation Programs	Virtual labs	E-Learning	AI in Education
✓	✓	✓	✓		✓	✓	✓		✓	✓			✓		

7- Students Evaluation:

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Quiz 1 written (Semester work)	5	5	5%
2	Quiz 2 written (Semester work)	10	5	5%
3	Midterm exam	8	10	10 %
4	Final Written Exam	15, 16	60	60 %
5	Final Practical Exam	14	10	10 %
6	Final Oral Exam	-	0	0
7	Assignments / Project	weekly	10	10 %
8	Field training	-	0	0
9	Other (Mention)	-	0	0



8- Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference	"Computer Networking: A Top-Down Approach" by James Kurose and Keith Ross (8th Edition, 2020).
	Other References	1. IEEE Communications Magazine 2. IEEE/ACM Transactions on Networking 3. IEEE Journal on Selected Areas in Communications 4. Computer Networks (Elsevier)
	Electronic Sources (Links must be added)	- https://www.comsoc.org/ - https://sigcomm.org/ - https://www.networkworld.com/ - https://learningnetwork.cisco.com/
	Learning Platforms (Links must be added)	Microsoft Teams
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computers, computer aided data show
	Supplies	White board, teaching aids
	Other (to be mentioned)	Lecturer Notes (PDF file, Presentation, and Word documents)

	Course Coordinator	Program Coordinator
Name	Dr. Mona Mohamed Fouad	Dr. Rania Ragab Hussien
Signature		